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AUGUST 1978

VOLUME 12, NO. 8

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GASTROENTEROLOGY

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NATIONAL INSTITUTE OF ARTHRITIS, METABOLISM, AND DIGESTIVE DISEASES

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

AUGUST 1978

VOLUME 12, NO. 8

5844–6567

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the
National Institute of Arthritis, Metabolism, and Digestive Diseases

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism ar Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

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SUBJECT INDEX

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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NOTE

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LANGUAGE ABBREVIATIONS

Afrikaans	Afr.	Georgian	Geo.	Persian	Per.
Albanian	Alb.	German	Ger.	Polish	Pol.
Arabic	Ara.	Greek	Gre.	Portuguese	Por.
Armenian	Arm.	Hausa	Hau.	Pushto	Pus.
Azerbaijani	Aze.	Hebrew	Heb.	Rumanian	Rum.
Belorussian	Bel.	Hindi	Hin.	Russian	Rus.
Bengali	Ben.	Hungarian	Hun.	Serbian	Ser.
Bulgarian	Bul.	Icelandic	Ice.	Slovak	Slo.
Burmese	Bur.	Indonesian	Ind.	Slovene	Slv.
Chinese	Chi.	Interlingua	Int.	Spanish	Spa.
Croatian	Cro.	Italian	Ita.	Swahili	Swa.
Czechoslovakian	Cze.	Japanese	Jpn.	Swedish	Swe.
Danish	Dan.	Kirghiz	Kir.	Tagalog	Tag.
Dutch	Dut.	Korean	Kor.	Tamil	Tam.
English	Eng.	Latin	Lat.	Telugu	Tel.
Esperanto	Esp.	Latvian	Lav.	Thai	Tha.
Estonian	Est.	Lithuanian	Lit.	Turkish	Tur.
Finnish	Fin.	Marathi	Mar.	Ukranian	Ukr.
Flemish	Fle.	Masai	Mas.	Urdu	Urd.
French	Fre.	Multilingual	Mlt.	Vietnamese	Vie.
Gaelic	Gae.	Norwegian	Nor.	Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	ml, μl	milli-, microliter(s)
ADP	adenosine diphosphate	mm	millimeter(s)
AMP	adenosine monophosphate	mOsm	milliosmolar; milliosmeter(s)
amp	ampere	msec	millisecond(s)
ATP	adenosine triphosphate	mV	millivolt(s)
A	angstrom	min	minute(s)
BSP	sulfobromophthalein	MTD	maximum tolerated dose
C	degrees centigrade	NAD	nicotinamide adenine dinucleotide
cal	calories	NADH	reduced nicotinamide adenine dinucleotide
cc	cubic centimeter	NADP	nicotinamide adenine dinucleotidephosphate
cm	centimeter(s)	NADPH	reduced nicotinamide adenine dinucleotidephosphate
dl	deciliter	ng	nanogram (10^{-9})
DNA	deoxyribonucleic acid	nm	nanometer(s)
ED_{50}	median effective dose(s)	Pa	ambient pressure
EDTA	ethylenediamine tetraacetic acid	PAS	periodic acid - Schiff
e.g.	for example	pg	picogram (10^{-12})
EEG	electroencephalogram	pgEq	picogram equivalent(s)
ESR	erythrocyte sedimentation rate	p.o.	orally
g	gram(s)	ppb	parts per billion
μg	microgram(s)	ppm	parts per million
Hz	Hertz	r	Roentgen
hr	hour(s)	RBC	red blood cells (erythrocytes), red blood count
Ig	immunoglobulin(s)	resp.	respectively
i.m.	intramuscular	RNA	ribonucleic acid
i.p.	intraperitoneal	s.c.	subcutaneous
IU	international unit(s)	sec	second(s)
i.v.	intravenous	SGOT	serum glutamic-oxalacetic transaminase
kcal	kilocalorie(s)	SGPT	serum glutamic-pyruvic transaminase
kg	kilogram(s)	U	unit(s)
K_m	Michaelis constant	UV	ultraviolet
LD_{50}	median lethal dose(s)	V	volt
LDH	lactic acid dehydrogenase	WBC	white blood cells (leukocytes), white blood count
m	meter(s)	yr	year(s)
M	molar; mole(s)		
mM	millimolar; millimole(s)		
μM	micromolar; micromole(s)		
ma	milliampere(s)		
mCi, μCi	milli-, microcurie(s)		
mEq	milliequivalent(s)		
mg	milligram(s)		

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

5844 ON THE TOPOGRAPHIC RELATIONSHIP BETWEEN THE DISTAL BRANCH OF LATARJET'S NERVE AND PROXIMAL DELIMITATION OF THE GASTRIC ANTRUM.

(Eng.) Brizzi, E.; Serantoni, C.; Ciani, P. A.; Fulignati, A.; Marinelli, R. (Universita di Firenze, Cattedra di Anatomia umana normale, Firenze, Italy). *Chir. Gastroenterol.* 11(3):297-298; 1977.

Histological investigations were carried out in 30 human stomachs to identify the boundary between the pyloric mucosa and that of the body and the fundus. This boundary was found to be situated on the lesser curvature, corresponding to the distal branch of Latarjet-Mitchell's nerve. Preoperative pH measurements confirmed these findings. In 20 stomachs, it was demonstrated that, on the lesser curvature, the mucosal boundary lies on a muscular ring formed by oblique fibers of gastric antral muscular membrane. The dissection of the distal branch of Latarjet-Mitchell's nerve showed the topographic relationship between this branch and the muscular ring. It is concluded that the distal branch of Latarjet-Mitchell's nerve topographically indicates the proximal delimitation of the gastric antrum.

5845 A SCANNING ELECTRON MICROSCOPIC STUDY OF NORMAL HUMAN OXYNTIC MUCOSA USING BLUNT DISSECTION AND FREEZE FRACTURE.

(Eng.) MacKercher, P. A.; Ivey, K. J.; Baskin, W. N.; Krause, W. J. (Harry S Truman Memorial Veterans Hosp., Columbia, MO). *Am. J. Dig. Dis.* 23(5):449-459; 1978.

To study the three-dimensional structure of the human gastric mucosa, biopsies from the fundic mucosa of healthy volunteers were examined by scanning electron microscopy following blunt dissection and freeze fracture. The mucosal surface exhibited a cobblestone appearance. With increased magnification, microvilli were demonstrated on the luminal surface of individual surface cells. Blunt dissection of the gastric mucosa revealed tubular gastric pits descending from the surface until they opened into branched tubular gastric glands. The gastric glands were irregular in outline due to the knoblike projections of individual parietal cells. The internal structure of the component cells also was examined with the scanning electron microscope following freeze fracture. Mucous granules were observed in the apical portion of surface epithelial cells. Lumina of parietal cell canaliculi were found to be continuous with the lumen of the gastric glands. Pepsinogen granules were seen throughout the chief cell cytoplasm. The blunt dissection-freeze fracture technique utilizing the scanning electron microscope allows, for the first time, a three-dimensional view of human gastric mucosa, including the gastric pits and glands as well as some of the internal architecture of component cells.

5846 IMMUNOHISTOCHEMICAL IDENTIFICATION AND LOCALIZATION OF PANCREATIC POLYPEPTIDE CELLS IN THE PANCREAS AND GASTROINTESTINAL TRACT OF THE HUMAN FETUS AND ADULT MAN.

(Eng.) Paulin, C.; Dubois, P. M. (Laboratoire d'Histologie et Embryologie, U.E.R. Medicale Lyon-Sud, B.P. n 12, 69600 Oullins, France). *Cell Tissue Res.* 188(2):251:257; 1978.

The evolution of pancreatic polypeptide (PP)-containing cells was studied in tissue from 5- to 24-week-old human fetuses, deceased premature infants, and normal adults. These cells were detected by using anti-bovine PP (BPP) serum in the pancreas and gastrointestinal tract specimens of the fetuses and premature infants and in biopsy-obtained specimens of the pancreas, antrum, and jejunum of adults with normal gastroduodenal endoscopy. Cell localization was established by studying the distribution of PP cells in comparison to the distribution of glucagon-, somatostatin-, and insulin-secreting cells. The first PP cells were seen in the pancreas at 10 weeks of gestation. They were located preferentially in the lower part of the head of the pancreas. The specificity of immunocytological reaction was ascertained by the inhibition of the reaction by preincubating the anti-BPP with BPP. Preincubation with somatostatin, gastrin, cholecystokinin, glucagon, or insulin did not modify the immunocytological reaction. Both the increased plasma levels of human PP and hyperplasia of PP cells previously reported in juvenile diabetes suggest a relation of PP to the physiopathology of diabetes.

5847 INTRAHEPATIC DISTRIBUTION OF NERVES IN THE RAT.

(Eng.) Reilly, F. D.; McCuskey, P. A.; McCuskey, R. S. (Coll. Medicine, Univ. Cincinnati, Cincinnati, OH 45267). *Anat. Rec.* 191(1):55-67; 1978.

As a result of the limited number of studies and lack of agreement on the intrahepatic distribution of nerves in the rat, a neurohistochemical and electron microscopic study of these nerves was initiated as part of an investigation of the neural component of mechanisms that regulate blood flow through the hepatic microvascular system in this species. Innervation was restricted primarily to vessels in the portal space and hilus. Both adrenergic and cholinergic fibers were observed in the adventitia of hepatic arteries, and to a lesser extent adjacent to portal veins. Some of the cholinergic fibers, however, were not contiguous with the vasculature. Near the hilus, many of these fibers were associated with ganglia, while, peripherally, some coursed into the immediately adjacent parenchyma where end bulbs abutted on hepatocytes. Ultrastructurally, scattered small nerves, devoid of neurolemma, were found contiguous with the portal lamina of hepatocytes. Nerve fibers deeper within the lobule were not seen, but numerous gap junctions were observed between contiguous hepatocytes. Central and sublobular hepatic veins lacked innervation, but adrenergic nerves were demonstrated in the walls of larger hepatic veins. Innervation of the biliary system was sparse. While nerves were interposed between vessels and bile ducts, such nerves tended to be associated more closely with the vasculature. Extreme care must be exercised in extrapolating results obtained from rodents, which have little hepatocellular innervation except by peripherally located cholinergic fibers, to primates, including humans, which have considerable innervation that is adrenergic rather than cholinergic.

5848 THE BIOCHEMICAL PHARMACOLOGY OF MUCUS. (Eng.) Parke, D. V.; Symons, A. M. (Dept. Biochemistry, Univ. Surrey, Guildford, Surrey, England). *Adv. Exp. Med. Biol.* 89:423-441; 1977.

5849 FUNCTIONAL ANATOMY OF MUCUS-SECRETING CELLS. (Eng.) Hafez, E. S. E. (Dept. Gynecology-Obstetrics, Wayne State Univ., 540 E. Canfield Ave., Detroit, MI 48201). *Adv. Exp. Med. Biol.* 89:19-38; 1977.

5850 CATALASE IN SALIVARY GLAND STRIATED AND EXCRETORY DUCT CELLS. II. ϕ BODY: AN ELLIPSOIDAL PEROXISOMAL ORGANELLE WITH CRYSTALLOID AXIAL PROJECTIONS. (Eng.) Hanker, J. S.; Silverman, M. S.; Romanovicz, D. K. (Dental Res. Center, Univ. North Carolina, Chapel Hill, NC 27514). *Histochem. J.* 9(6):729-744; 1977.

5851 COMPARATIVE ANATOMICAL STUDY OF THE CHOLEDOCHODUODENAL JUNCTION IN MAN, PIG, RABBIT AND RAT. (Eng.) Germain, M.; Martin, E.; Gremillet, C. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice June 8-9, 1976.* (Basel: S. Karger): 6-12; 1977.

5852 A HISTOLOGICAL STUDY OF THE SPHINCTER OF ODDI. (Eng.) Fernandez-Cruz, L.; Pera, C. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 13-20; 1977.

5853 IS THE SPHINCTER OF ODDI A REALITY IN MAN? (Eng.) Floquet, J.; Laurent, J.; Plenat, F.; Watrin, B. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 21-24; 1977.

5854 MORPHOLOGICAL STUDIES BY PER-OPERATIVE TRANSCYSTIC RADIOMANOMETRY. (Eng.) Soler, R. P. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 25-29; 1977.

See also, 5873, 5884, 5896, 5919, 5935, 5936, 5950, 6011, 6015, 6034, 6052, 6123, 6180, 6185, 6224, 6398.

ABSORPTION - EXCRETION - TRANSPORT

5855 ALTERATIONS IN RAT JEJUNAL PERMEABILITY TO A MACROMOLECULAR TRACER DURING A HYPEROSMOTIC LOAD. (Eng.) Cooper, M.; Teichberg, S.; Lifshitz, F. (North Shore Univ. Hosp., 300 Community Drive, Manhasset, NY 11030). *Lab. Invest.* 38(4):447-454; 1978.

The effects of intraluminal hyperosmolality on the intestinal permeability of a macromolecular tracer, horseradish peroxidase, was assessed in rats by light and electron microscopic cytochemistry to examine the role of hyperosmolality in the breakdown of the intestinal macromolecular barrier in some pathological conditions or stress situations. After 60 min of an intraluminal hypertonic perfusion of 600 mOsm mannitol, horseradish peroxidase was demonstrable in the intercellular spaces between adjacent absorptive epithelial cells of jejunal villi along the microvillar brush border, in numerous pinocytotic vesicles, in multivesicular bodies, as well as in large lysosomes. Horseradish peroxidase was frequently found extending from the luminal surface of the cell through the tight junctional region and into more basal portions of the intercellular space. In occasional cells, fragments of the interdigitating plasma membranes of two adjacent absorptive cells appeared to bud off into the cytoplasm of one cell. In contrast, after 60 min of isotonic perfusion, horseradish peroxidase was confined to the microvillar brush border, a few pinocytotic vesicles, and occasional multivesicular bodies. These experiments suggest that the passage of macromolecules across the jejunal epithelium of adult rats is enhanced under conditions of luminal hyperosmotic stress. This enhancement may be due to an alteration in the functional integrity of the tight junctional macromolecular barrier or to an increased rate of pinocytosis.

5856 THE USE OF THIRY-VELLA LOOP OF JEJUNUM TO STUDY THE INTESTINAL ABSORPTION OF CALCIUM AND INORGANIC PHOSPHATE IN THE CONSCIOUS PIG.

(Eng.) Fox, J.; Care, A. D.; Swaminathan, R. (Dept. Animal Physiology and Nutrition, Univ. Leeds, Leeds LS2 9JT, England). *Br. J. Nutr.* 39(3): 431-439; 1978.

Pigs prepared with Thiry-Vella jejunal loops were used to study intestinal calcium and inorganic phosphate absorption to investigate the mechanism of absorption. The loops were perfused daily for 6-8 hr with a nutrient solution, and absorption from the perfusate was measured. The technique employed minimized atrophy of the jejunal mucosa and enabled the measurement of hourly or daily changes in absorption rate of components of the luminal fluid. No differences were observed when polyethylene glycol (PEG, molecular weight 4,000), ^{14}C-PEG, or ^{51}Cr-EDTA were used as markers of net water movement. Increasing the concentration of Ca in the perfusate resulted in the demonstration of a two-component relationship between net absorption rate of Ca and intraluminal Ca concentration. An initial rapid absorption rate from 0 to 4 mM was found, and then a slower rate from approximately 5 mM upwards that did not saturate at the highest concentration tested (25 mM). Increasing the concentration of phosphate in the perfusion solution increased the net absorption of phosphate from that solution. Although a two-component system, similar to that for Ca, was not evident, net absorption of phosphate was not saturated at the highest concentration tested (50 mM). The absorption of Ca was unaffected by the presence of phosphate in the solution, but Ca (2-5 mM) enhanced phosphate absorption.

5857 THE INTESTINAL HANDLING OF CALCIUM BY THE RAT IN VIVO, AS AFFECTED BY CORTISOL. EFFECT OF DIETARY CALCIUM SUPPLEMENTS.

(Eng.) Ferretti, J. L.; Bazan, J. L.; Alloatti, D.; Puche, R. C. (Facultad de Medicina, Universidad Nacional de Rosario, Santa Fe 3100, 2000 Rosario, Argentina). *Calcif. Tissue Res.* 25(1):1-6; 1978.

The effects of cortisol on intestinal management of calcium and on related changes on bone metabolism were studied in five groups of 12 rats each fed a standard diet (0.8% Ca) and receiving 2, 6, 16, 32, or 128 mg/kg/day of cortisol hemisuccinate, s.c. After 16 days, intestinal absorption and excretion of Ca were measured with the aid of ^{45}Ca. True Ca absorption increased as a function of dose up to 16 mg/kg/day and remained high with the larger doses. Endogenous fecal Ca excretion increased exponentially as a function of the dose from 16 mg/kg/day onwards. Therefore, a dual effect was observed: (a) an increase in true Ca absorption at low cortisol doses (which increased net Ca absorption) and (b) an increase in endogenous fecal Ca excretion at high doses (which reduced net Ca absorption). In no case was a depression of true Ca absorption observed. Growth rate and food conversion efficiency were depressed only with a cortisol dose of 128 mg/kg/day. The urinary excretion of hydroxyproline, pyrophosphate, and aminopolysaccharides decreased with low doses and increased above normal levels with the highest dose. When animals treated with 128 mg/kg/day of cortisol were fed Ca-enriched diets (2.0 or 3.0% Ca), net Ca absorption improved ($p<0.01$). Simultaneously, growth rate and food conversion efficiency approached normal values. In these experiments, net absorption of Ca was found to be inversely related to urinary excretion of hydroxyproline. The urinary rate of excretion of hydroxyproline is suggested as an indicator of the effect of a Ca supplement on cortisol affected connective tissue turnover.

5858 ION TRANSPORT BY RABBIT COLON: II. UNIDIRECTIONAL SODIUM INFLUX AND THE EFFECTS OF AMPHOTERICIN B AND AMILORIDE.

(Eng.) Frizzell, R. A.; Turnheim, K. (Univ. Pittsburgh Sch. Medicine, Pittsburgh, PA 15261). *J. Membrane Biol.* 40(3):193-211; 1978.

To further examine the properties of Na and K transport in the rabbit colon, the unidirectional influx of Na from the mucosal solution into the epithelium was determined, and the effects of amiloride and amphotericin B on Na entry were evaluated. The unidirectional influx of Na from the mucosal solution into the epithelium of *in vitro* descending rabbit colon (J_{mc}^{Na}) determined under short-circuit conditions was found to be comprised of two components. One represents entry of Na into transporting epithelial cells and was abolished by amiloride (10^{-4} M), which also abolished Na absorption (J_{net}^{Na}). The other represented diffusional Na entry into paracellular pathways traversing the epithelium. In all instances, exposure of the mucosal surface to amphotericin B (15 μg/ml) increased tissue conductance and J_{net}^{Na} and elicited K secretion. Tissues showing a spontaneous short-circuit current (I_{sc}) of approximately 4 μEq/cm^2/hr did not respond to amphotericin B with increased I_{sc} and J_{net}^{Na}. However, in tissues characterized by a lower I_{sc} under control conditions, amphotericin B increased I_{sc} and J_{net}^{Na} to approximately 4 μEq/cm^2/hr. These findings suggest that amphotericin increases J_{net}^{Na} and elicits K secretion by disrupting the normal perm-selectivity of the mucosal membrane. Under these conditions the extrusion of Na from cell-to-serosal solution becomes the rate limiting step in transepithelial Na transport. Finally, a close correlation between J_{mc}^{Na} and J_{net}^{Na} was observed when the rate of Na absorption varied either spontaneously or experimentally with amiloride, suggesting that the backflux of Na from cell-to-mucosal solution is undetectably small.

5859 SODIUM TRANSPORT BY ISOLATED BULLFROG SMALL INTESTINE: EFFECT OF PROSTAGLANDIN

E_1. (Eng.) Gerencser, G. A.; Tyler, T.; Cassin, S. (Univ. Florida, Coll. Medicine, Gainesville, FL). *Biochim. Biophys. Acta* 509(1):159-169; 1978.

Prostaglandin E_1 (PGE_1, 446 μM) was added to the serosal and mucosal media of isolated short-circuited bullfrog small intestine to investigate the mechanism of its stimulatory action on sodium secretion in the small intestine. The addition of PGE_1 to the serosal medium elicited small increases in transmural potential difference (PD) and short-circuit current (SCC), while addition of PGE_1 to the mucosal medium caused no change in the electrical parameters. The addition of 100 μM indomethacin to the mucosal medium inhibited both PD and SCC with a resultant increase in steady-state tissue resistance. In the presence of mucosal 100 μM indomethacin, serosal PGE_1 (60 μM) markedly stimulated transmural PD and SCC with a resultant decrease in steady-state tissue resistance. Serosal arachidonic acid (330 μM) stimulated transmural PD and SCC and this effect was abolished by the addition of 100 μM indomethacin to the mucosal medium. Serosal PGE_1 (60 μM) only stimulated the mucosa→serosa unidirectional flux of sodium. These results strongly suggest that the PGE_1 action is mediated either via a series of metabolic reactions that possibly increase the permeability of the mucosal membrane to sodium or via direct stimulation of rheogenic sodium pump activity.

5860 Na^+ TRANSPORT BY MAMMALIAN STOMACH. (Eng.) Machen, T. E.; Silen, W.; Forte, J. G. (Dept. Physiology-Anatomy, Univ. California, Berkeley, CA 94720). *Am. J. Physiol.* 234(3):E228-E235; 1978.

Gastric mucosas from newborn pigs (0-20 days) and rabbits (0-20 days) were used for an *in vitro* investigation of active Na^+ transport during resting (no HCl secretion) conditions. As measured with $^{22}Na^+$, these tissues were found to actively absorb Na^+ from the mucosal-to-serosal (m-to-s) bathing solution during both open-circuit and short-circuit current (I_{sc}) conditions. In the nonsecreting state, net Na^+ transport accounted for 40-60% of I_{sc}. The remaining current was provided by net s-to-m flux of Cl^-. Amiloride (2-5 x 10^{-5} M) in the mucosal solution abolished this active Na^+ transport by inhibiting m-to-s fluxes of Na^+ (J^{Na}_{ms}). *In vivo-in vitro* experiments showed that active Na^+ transport was a normal function of the resting mammalian stomach. Decreasing the pH of the mucosal solution to below pH 5 reversibly decreased the current-generating capability of the tissue. Pretreatment of the tissue with amiloride abolished this pH effect. The implication is that the low pH affects the Na^+-entry step into cells. "Titration curves" of current versus pH had an apparent pK of approximately 4.0. Ouabain and K^+-free solutions both caused decreases in active Na^+ and Cl^- current. Calculations indicated that a shunt may account for only a small (<30%) percentage of total transepithelial conductance.

5861 GLUCOSE AND CATION TRANSPORT IN RAT JEJUNUM, ILEUM AND COLON IN VIVO: CONTROL EXPERIMENTS, AND EFFECT OF CATIONIC SURFACTANT. (Eng.) Sund, R. B. (Inst. Pharmacy, Univ. Oslo, P.O. Box 1068, Blindern, Norway). *Acta Pharmacol. Toxicol. (Kbh.)* 42(2):117-124; 1978.

To investigate the mechanism by which surfactants affect intestinal glucose transport, osmotically balanced solutions of glucose (0.5-300 mM) and sodium chloride, containing cetrimonium bromide (cetrimide, 0.8-4.1 mM), were instilled into the jejunum, ileum, and colon of anesthetized rats. Net transport of glucose, sodium, and potassium was studied by their disappearance from or accumulation into the intestinal lumen during 15 min of incubation. Cetrimide caused the following shifts in normal jejunal and ileal glucose absorption: at low luminal glucose levels, absorption was strongly depressed and may be converted to net secretion. At intermediate levels, inhibition was less pronounced, and at high luminal glucose levels, absorption was enhanced. Similar changes were seen in the colon. Furthermore, cetrimide caused a threefold change in the regression lines relating net sodium fluxes to the initial sodium concentration. The lines became steeper, the correlation was improved, and the sodium concentration value corresponding to zero net transport was elevated. Net potassium secretion was increased. These changes are all consistent wit the view that surfactants cause an increase in passive epithelial permeability. Quantitatively, the effect of cetrimide increased with localization in the order colon>ileum>jejunum. Benzalkonium chlorid (0.5-1.7 mM) was tested in the ileum only, and cause similar effects.

5862 EFFECT OF DIESTER AND DIETHER PHOSPHATIDYLCHOLINE ON INTESTINAL ABSORPTION OF NEUTRAL ACIDIC STEROLS. (Eng.) O'Connor, P. J.; Loiudice, T. A.; Bochenek, W.; Rodgers, J. B. (Albany Medical Coll., Albany, NY 12208). *Am. J. Dig. Dis.* 23(4):316-320; 1978.

To determine whether the delay in cholesterol absorption noted when phosphatidylcholine is infused intraduodenally with dihydroxy bile salt plus natural phospholipid might be mediated via a delay in digestion and subsequent absorption of the phospholipid, the effects of nondigestible diether phosphatidylcholine on intestinal cholesterol and dihydroxy and trihydroxy conjugated bile salt absorption were studied in bile fistula rats using radioactive substrates. No inhibition of absorptio of either dihydroxy or trihydroxy bile salts was observed. Nondigestible phospholipid did, however, significantly inhibit cholesterol absorption ($p<0.0$ when infused with taurocholate [TC]; $p<0.05$ with taurochenodeoxycholate [TCD]). Under control conditions with natural phosphatidylcholine in the intestinal perfusate, cholesterol absorption was significantly greater ($p<0.01$) when infused with TC as compared to results obtained after infusion with TCD. Studies were repeated using radioactive rat liver phosphatidylcholine to determine whether the observed decrease in cholesterol absorption could be correlated with a decrease in digestion and absorption of rat liver phosphatidylcholine. No evidence was found for decreased absorption of his phospholipid when given with TCD. It is concluded that less cholesterol is absorbed in the resence of TCD than of TC, but the mechanism for his difference remains unexplained.

5863 VITAMIN D-3 INTESTINAL ABSORPTION IN VIVO: INFLUENCE OF FATTY ACIDS, BILE SALTS, AND ERFUSATE pH ON ABSORPTION. (Eng.) Hollander, D.; uralidhara, K. S.; Zimmerman, A. (Scott Hall asic Medical Sciences, 540 E. Canfield, Detroit, I 48201). *Gut* 19(4):267-272; 1978.

ntestinal vitamin D-3 absorption in physiological oncentrations was studied in the live unanesthetized rat, and the effects of fatty acids, bile alts, and perfusate pH were investigated. In both he jejunum and the ileum, a linear relation as found between the absorption rate of the vitamin nd its intraluminal concentration. Increasing the odium taurocholate concentration in the perfusate bove 5 mM did not change ileal absorption rate but id decrease jejunal absorption rate. The vitamin's bsorption rate was raised by increases in either the hydrogen ion concentration or the perfusate's low rate. Addition of 2.5 mM fatty acids of varying chain length and degrees of saturation resulted in a decrease in the rate of vitamin D-3 absorption. These experiments indicate that vitamin D-3 absorption *in vivo* is mediated by passive diffusion. The rate of absorption of the vitamin is influenced by the composition of the perfusate and the thickness of the unstirred layer.

5864 ROLE OF GLUCOCORTICOIDS ON ION TRANSPORT AND TRANSMURAL PD IN COLON [Abstract]. (Eng.) Bastl, C. P.; Hayslett, J. P.; Binder, H. J. (Dept. Medicine, Temple Univ., Philadelphia, PA). *Clin. Res.* 25(3):306A; 1977.

5865 A SINGLE POPULATION OF CALCIUM CHANNELS REGULATED BY THREE DIFFERENT RECEPTORS IN THE RAT PAROTID GLAND [Abstract]. (Eng.) Putney, J. W., Jr. (Wayne State Univ., Detroit, MI 48201). *Fed. Proc.* 36(3):457; 1977.

5866 CLINICAL EVALUATION OF THE USE OF $^{47}CaCl_2$ IN A TEST OF THE GASTROINTESTINAL ABSORPTION OF CALCIUM [Abstract]. (Eng.) Hartley, T. F. (Inst. Medical and Veterinary Science, Frome Rd., Adelaide 5000, Australia). *Aust. N.Z. J. Med.* 7(3): 345; 1977.

5867 CARRIER-MEDIATED CALCIUM TRANSPORT BY GOLGI-RICH MEMBRANE VESICLES FROM RAT INTESTINE: DECREASED IN VITAMIN D DEFICIENT RATS [Abstract]. (Eng.) Freedman, R. A. (Massachusetts General Hosp., Boston, MA). *Gastroenterology* 72(5, Part 2):1187; 1977.

5868 IRON TRANSPORT BY SMALL INTESTINAL PLASMA MEMBRANES [Abstract]. (Eng.) Eastham, E. J.; Bell, J. I.; Douglas, A. P. (Dept. Medicine, Univ. Newcastle upon Tyne, Newcastle upon Tyne, England). *Gastroenterology* 72(5, Part 2):1180; 1977.

5869 PASSAGE OF IRON AND COBALT OUT OF THE SUBCELLULAR FRACTIONS OF THE INTESTINAL MUCOSA OF THE RAT [Abstract]. (Eng.) Thomson, A. B. R.; Valberg, L. S. (Dept. Medicine, Univ. Alberta, Edmonton, Alberta, Canada). *Gastroenterology* 72(5, Part 2):1141; 1977.

5870 FUNCTIONAL SIGNIFICANCE OF INTESTINAL Na-K-ATPASE: IN VIVO OUABAIN INHIBITION OF INTESTINAL Na AND WATER ABSORPTION [Abstract]. (Eng.) Charney, A. N.; Donowitz, M. (Walter Reed Army Inst. Res., Washington, DC). *Gastroenterology* 72(5, Part 2):1037; 1977.

See also, 5890, 6018, 6023, 6050, 6224, 6250.

MOTILITY

5871 ESOPHAGEAL GANGLIA AND SMOOTH MUSCLE IN THE ELDERLY. (Eng.) Eckardt, V. F.; LeCompte, P. M. (I. Medizinische Universitatsklinik Mainz, 65 Mainz, Langenbeckstrasse 1, W. Germany). *Am. J. Dig. Dis.* 23(5):443-448; 1978.

To study the etiology of esophageal motor dysfunction in elderly persons, the histology of Auerbach's plexus and esophageal smooth muscle was examined in autopsy material from 9 young (29 ± 2.2 yr) and 15 elderly (77.4 ± 2.8 yr) subjects. There was a significant decrease in ganglion cells (1,685 ± 115.9/cm^2) in elderly subjects when compared to young controls (2,253 ± 216.9/cm^2, $p<0.05$). Lymphocytic infiltration of Auerbach's plexus was commonly observed in both groups of patients, but heavy lymphocytic infiltration was slightly more common in elderly subjects. No difference was found in thickness of esophageal smooth muscle between young and old subjects. It is concluded that diminution of ganglion cells rather than smooth muscle atrophy may explain the frequent occurrence of esophageal motor dysfunction in elderly persons.

5872 ELECTRICAL ACTIVITY OF THE OPOSSUM LOWER ESOPHAGEAL SPHINCTER IN VIVO: ITS ROLE IN THE BASAL SPHINCTER PRESSURE.

(Eng.) Asoh, R.; Goyal, R. K. (Univ. Texas Health Science Center, 5323 Harry Hines Blvd., Dallas, TX 57235). *Gastroenterology* 74(5, Part 1):835-840; 1978.

Studies were performed in anesthetized opossums to investigate the electrical control of the lower esophageal sphincter. The stomach and lower end of the esophagus were immobilized on a specially prepared stage to eliminate movement artifacts. Extracellular electrical activity was recorded with bipolar needle electrodes. The sphincter pressure was measured with a continuously perfused catheter system. The lower esophageal sphincter showed continuous spike activity with or without phasic variations in their occurrence. The usual frequency of the spikes was 20-50/min, and their mean duration was 81.2 ± 8.9 msec. The spike potentials ceased with esophageal distention, which also caused a fall in the sphincter pressure. The spikes were abolished by isoproterenol (2.5 μg/kg, i.v.) and they increased with bethanechol (20 μg/kg, i.v.). Correlation of the spike activity with the pressure revealed that the sphincter pressure was higher when the spike potentials were present, but a major part of the pressure existed in the absence of any spike activity. These studies show that (1) the opossum lower esophageal sphincter is characterized by continuous spike potentials and (2) the major fraction of the basal pressure is, however, independent of the spike potentials.

5873 MOTOR INNERVATION OF STRIATED OESOPHAGEAL MUSCLE. PART 2. CHARACTERISTICS OF THE OESOPHAGOMOTOR FIBRES IN THE RAT STUDIED BY IMPLANTING THE VAGUS NERVE INTO A SKELETAL MUSCLE.

(Eng.) Gruber, H. (II. Anatomisches Institut der Universitat Wien, A-1090 Vienna, Austria). *J. Neurol. Sci.* 36(2):171-186; 1978.

In 12 rats, the right vagus nerve distal to its recurrent laryngeal branch was implanted into the inferior segment of the denervated sternohyoid muscle to determine whether the esophagomotor fibers, prior to joining the myenteric plexus, can form functionally adequate neuromuscular junctions. One month after implantation, the first signs of neuromuscular transmission at the vagal motor endings could be recorded. Two months after implantation, the reinnervated muscles showed vigorous contractions on electrical stimulation of the vagus nerve. During the performance of propulsive waves of the esophagus, the implanted vagus nerve caused clonic to tetanic contractions of the sternohyoid muscle, thus proving the esophagomotor genesis of the reinnervating nerve fibers. In addition, the vagus-innervated motor end-plates were shown to exhibit the same ultrastructural peculiarities as the original neuromuscular junctions of the esophagus. In sections stained for cholinesterase, it was demonstrated that the esophagomotor fibers had preferentially reinnervated the denervated motor end-plates. In many instances, the subneural apparatus was not completely covered by the vagal axon terminals. Newly formed, ectopic vagal motor endings were few in number and confined to muscle fibers immediately adjacent to the site of nerve-implantation. Six months after implantation, some of the vagal motor endings showed signs of degeneration. As in the esophagus, the reinnervating esophagomotor fibers proved to be unmyelinated, sometimes forming a plexus-like intramuscular network before terminating at motor end-plates. Myelinated vagal nerve fibers were also observed running between the skeletal muscle fibers, but they did not establish any demonstrable form of neuromuscular contacts. It is concluded that in the rat the myelinated fibers of the esophageal nerves are afferent, whereas the esophagomotor fibers, although supplying striated muscle, are unmyelinated.

5874 THE EFFECT OF ATROPINE ON THE LOWER ESOPHAGEAL SPHINCTER IN LATE PREGNANCY.

(Eng.) Dow, T. G. B.; Brock-Utne, J. G.; Rubin, J.; Welman, S.; Dimopoulos, G. E.; Moshal, M. G. (Dept. Obstetrics and Gynecology, Univ. Natal, South Africa). *Obstet. Gynecol.* 51(4):426-430; 1978.

Intraluminal pressure and pH changes at the gastroesophageal region before and after atropine administration were studied in pregnant and nonpregnant women, because atropine is used prior to caesarean section and could possibly lead to esophageal reflux, regurgitation, and aspiration. Eight nonpregnant women, 10 pregnant women with heartburn, and 10 pregnant women without heartburn were studied. Each patient was tested under resting conditions and after the i.v. injection of atropine (0.6 mg). In both groups of pregnant patients, the intragastric pressure was higher than that of the nonpregnant subjects ($p<0.01$ before atropine, $p<0.005$ after atropine). The stomach to lower esophageal sphincter pressure (LESP) gradient under resting conditions was lowest in the pregnant patients with heartburn. After the administration of atropine, a fall in the LESP occurred in all three groups of patients and was most profound in the nonpregnant subjects (9.6 cm H_2O, $p<0.02$) and in the pregnant patients without heartburn (17.1 cm H_2O, $p<0.05$). These changes and the pH recordings of the lower esophagus indicate the adverse effect that atropine has on the competency of the LESP both in pregnancy and in the nonpregnant state. Atropine should therefore be used with caution as a premedicant and preferably combined with metoclopramide.

5875 EFFECT OF THORACIC VAGOTOMY AND VAGAL STIMULATION ON ESOPHAGEAL FUNCTION.

(Eng.) Kravitz, J. J.; Snape, W. J., Jr.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia, PA 19104). *Am. J. Physiol.* 234(4):E359-E364; 1978.

To gain information on esophageal innervation by the thoracic portion of the vagus nerves, the effect of thoracic vagotomy and thoracic vagal stimulation upon esophageal peristalsis and lower esophageal sphincter (LES) function was studied in the opossum. The thoracic portion of the vagus nerve was sectioned in the upper or lower thorax. Bilateral, but not unilateral, thoracic vagotomy above the level of the heart abolished peristalsis and LES relaxation in response to swallowing or cervical vagal electrical stimulation. Thoracic vagotomy at the level of the ventricle or below did not alter either peristalsis or LES relaxation during swallowing or cervical vagal stimulation. Secondary peristalsis and its associated LES relaxation was unaltered by thoracic vagotomy at any level. Electrical stimulation of the distal end of the upper thoracic vagus elicited both peristalsis and LES relaxation. Electrical stimulation of the distal end of the lower thoracic vagus, as well as stimulation of the vagal branches to the terminal esophagus, gave only LES relaxation. These studies suggest that (a) the major extrinsic vagal innervation mediating primary peristalsis terminates in the upper portion of the esophagus, whereas the vagal innervation mediating LES relaxation responses are present throughout the length of the esophagus, and (b) secondary peristalsis and its associated LES relaxation occurs independent of extrinsic vagal innervation.

5876 MYOELECTRICAL AND MECHANICAL ACTIVITY OF ISOLATED CANINE STOMACH PERFUSED IN VITRO WITH FLUOROCARBON: ROLE OF GLUCOSE, PHOSPHATE, CALCIUM AND STRONTIUM IN THE PERFUSATE.

(Eng.) Kowalewski, K.; Kolodej, A. (Surgical-Medical Res. Inst., Univ. Alberta, Edmonton T6G 2N8, Canada). *Pharmacology* 16(5):247-258; 1978.

Myoelectrical and mechanical activities were recorded from whole isolated canine stomachs perfused intravascularly with fluorocarbon emulsion, oxygenated *in vitro*, to assess the use of this bloodless artificial perfusate in preserving the stomach during secretory and motility studies. The perfusate was composed of an oxygen carrier (liquid fluorocarbon) emulsified with a surfactant and added to a simulated physiological solution. Bipolar electrodes and a strain gauge were used for recordings. Stomachs perfused for 5 hr displayed normal electrical and mechanical activities (i.e., identical with those observed under *in vivo* conditions or during perfusion with homologous blood). Normal responses to electrical stimulation of a vagus nerve branch or to the intraarterial injection of 10 μg methacholine or 5 μg pentagastrin were also observed. These functions of smooth muscles were not altered when glucose-free or glucose- and phosphate-free perfusate were used. In calcium-free perfusate, electrical and mechanical activities were absent, and no responses to stimulants used were recorded. When calcium was added to the perfusate, these functions were restored to normal. Strontium was found to be an adequate substitute for calcium in fluorocarbon perfusate. Gastric secretions were alkaline and contained fluorocarbon emulsion. These studies demonstrate that myoelectrical and mechanical activity of the isolated canine stomach is well preserved during perfusion with fluorocarbon emulsion.

5877 CHOLECYSTOKININ INHIBITS GASTRIC EMPTYING BY ACTING ON BOTH PROXIMAL STOMACH AND PYLORUS.

(Eng.) Yamagishi, T.; Debas, H. T. (Dept. Surgery, Univ. British Columbia, Vancouver, British Columbia, V5Z 1L5, Canada). *Am. J. Physiol.* 234(4): E375-E378; 1978.

The relative importance of the ability of cholecystokinin to relax the proximal stomach and to contract the pyloric sphincter in its inhibitory effect on gastric emptying was investigated in dogs by studying the effectiveness of the C-terminal octapeptide of cholecystokinin (OP-CCK) to inhibit the emptying of a liquid meal (300 ml saline) before and after operations that either remove or destroy the pyloric mechanism (antrectomy and pyloroplasty), or lead to loss of accommodation of the proximal stomach (vagotomy), and after both vagotomy and antrectomy, and vagotomy and pyloroplasty. OP-CCK caused dose-related (32-250 ng/kg/hr) inhibition of gastric emptying in the intact dog. After either pyloroplasty or antrectomy the effectiveness of low (32-125 ng/kg/hr) but not of high doses of OP-CCK (250-500 ng/kg/hr) was lost. After vagotomy, OP-CCK at any dose was ineffective. The findings suggest that cholecystokinin inhibits gastric emptying by acting both on the pylorus and on the proximal stomach.

5878 EFFECTS OF DOMPERIDONE (R 33812) ON THE MOTOR FUNCTION OF THE STOMACH AND SMALL INTESTINE: A DOUBLE-BLIND EVALUATION.

(Eng.) Baeyens, R.; Reyntjens, A.; Van de Velde, E. (Janssen Pharmaceutica N. V., B-2340 Beerse, Belgium). *Arzneim. Forsch.* 28(4):682-686; 1978.

To investigate the mechanism of the new antiemetic agent, domperidone, the effect of i.v. domperidone on the motor function of the stomach and small intestine was evaluated in three consecutive controlled studies using different treatment regimens. Two hundred one patients were referred to the radiodiagnostic department for a barium meal with a follow-through examination. In study A, 48 patients received either domperidone (8 mg) or a placebo, given simultaneously with the barium meal. In study B, the same treatment was used in 50 patients, but the injections were given 30 min before the barium. Twenty-four other patients received metoclopramide (10 mg) instead of domperidone or a placebo. In study C, the domperidone injections were given 15 min after the barium meal in 49 patients. Thirty other patients received either the placebo (10), domperidone (10), or metoclopramide (10). Peristaltic activity of the antrum, gastric emptying, and small bowel transit time were evaluated after the ingestion of the barium meal, and before and/or after the drug injections. Antral peristalsis was more activated with domperidone and metoclopramide than with placebo, but this effect was seen only when domperidone was administered either before ($p<0.05$) or after ($p<0.001$) the administration of the barium meal. Regardless of the time of administration, gastric emptying was accelerated by domperidone ($p<0.05$) and by metoclopramide. Bowel transit was accelerated by both domperidone and metoclopramide ($p<0.01$). Both domperidone and metoclopramide improved motor function in the proximal part of the gastrointestinal tract. It is concluded that domperidone synchronizes gastrointestinal motor function due to a more protractive activity, whereas metoclopramide merely acts as a "hurrying" agent.

5879 GASTRIC EMPTYING IN THE CAT IN RESPONSE TO HYPERTONIC SOLUTIONS AND TRYPTOPHAN. (Eng.) Cooke, A. R. (Kansas Univ. Medical Center, Rainbow Blvd. at 39 St., Kansas City, KS 66103). *Am. J. Dig. Dis.* 23(4):312-315; 1978.

To study possible species differences in the response of gastric emptying to hypertonic sugar and amino acid solutions and tryptophan, gastric emptying studies were carried out in 10 cats and 4 dogs, each having a gastric fistula. Test meals of 50 ml (cats) or 300 ml (dogs) containing phenol red as a nonabsorbable marker were instilled into the stomach via the gastric fistula and were drained by gravity 25-30 min later. The test meals were water, hypertonic solutions (250-1,000 mOsm/kg) of casein hydrolysate, D-glucose, mannitol, glycine, L-alanine, D-alanine, β-alanine, L- and D-tryptophan, and L-phenylalanine in concentrations (osmolalities) ranging from 5 to 100 mM. In the cats, gastric emptying was slowed with increasing osmolality of the test solution; glucose and mannitol were equipotent but much less effective than glycine or casein hydrolysate. This difference in potencies was not found for these substances in the dogs. Gastric emptying was inhibited by tryptophan in the cats and was stereospecific, only the L form being effective. This inhibition was not due to the effect of tryptophan on acid secretion. Stereospecificity was not found for the osmoreceptor. Combining L-tryptophan with another neutral amino acid (L-alanine) inhibited the effect of tryptophan. Phenylalanine in concentrations up to 80 mM had no effect on gastric emptying in the cats. These studies indicate differences between cats and dogs in response to osmotic agents and also show that, like the dog, the cat has a tryptophan receptor.

5880 SMALL-INTESTINAL TRANSIT DURING TOTAL PARENTERAL NUTRITION IN THE RAT. (Eng.) Weisbrodt, N. W.; Badial-Aceves, F.; Copeland, E. M.; Dudrick, S. J.; Castro, G. A. (Univ. Texas Medical Sch., P.O. Box 20708, 6400 W. Cullen, Houston, TX 77030). *Am. J. Dig. Dis.* 23(4):365-369; 1978.

The hypothesis that alterations in small bowel motility are associated with total parenteral nutrition (TPN) was tested. Motility, as reflected by intestinal transit, was studied in rats maintained by TPN for 7-10 days and compared with that of rats fed a p.o. diet isocaloric with the i.v.-administered solution. Transit was measured by injecting radioactively labeled chromium ($Na_2{}^{51}CrO_4$) into the duodenum via permanently implanted catheters. The animals were killed 15 min after injecting the label, and the linear distribution of the isotope in the gut was determined. The leading edge of radioactivity traversed 75-87% (95% confidence limit) of the gut length in p.o.-fed rats and 83-97% in rats on TPN. The difference between the average position of these fronts for the two groups was not statistically significant. In addition, the regression of percentage radioactivity traversi or present in a given segment on gut length yielded a slope with 95% confidence limits of -10.48 to -15.02 for p.o.-fed control rats and -9.83 to -12.8 for rats on TPN ($p>0.05$). These results support the conclusion that factors that regulate small bowel motility are not altered significantly by TPN during the time that other functional and structura changes reportedly occur.

5881 THE SACRAL PARASYMPATHETIC REFLEX PATHWAY REGULATING COLONIC MOTILITY AND DEFAECATION IN THE CAT. (Eng.) De Groat, W. C.; Krier, J. (Medical Sch., Univ. Pittsburgh, Pittsburgh, PA 15261). *J. Physiol. (Lond.)* 276:481-500; 1978.

To examine the role of the sacral parasympathetic pathway to the colon in the regulation of colonic motility, intestinal motility and the efferent firing in postganglionic fibers on the serosal surface of the mid-distal colon were measured simultaneously in cats. Increases in efferent firing were noted during the occurrence of spontaneous propulsive activity (tonic pressure waves) or segmental contractions (slow rhythmic pressure waves). The neural discharge was not altered by transection of the lumbar sympathetic innervation to the colon but was blocked by interruption of the sacral parasympathetic outflow. Electrical stimulation of pelvic nerve afferents arising in the colon or distention of the colon or rectum evoked reflex increases in efferent firing and sustained propulsive contractions that were associated with defecation. Both responses were abolished by transection of the pelvic nerves or sacral dorsal roots. Electrical stimulation of colonic afferent fibers also evoked synchronous reflex discharges in colonic efferents at latencies ranging from 180 to 300 msec. The discharges were enhanced during propulsive contractions, and abolished by transection of the pelvic nerves but not altered by transection of the lumbar sympathetic nerves. Sacral reflexes were present in cats with an intact spinal cord and in chronic spinal animals (transection at thoracic vertebrae 10-12). The reflexes recovered within minutes to several hours after acute transection of the spinal cord. Electrophysiological measurements indicated that the sacral reflexes to the large intestine were mediated by nonmyelinated afferent and preganglionic efferent fibers. The central delay for the reflex was estimated to be 45-60 msec. It is concluded that the sacral parasympathetic reflexes to the large intestine are mediated via a spinal pathway and have an essential role in the initiation of propulsive activity during defecation.

5882 SPHINCTERIC MECHANISM OF THE MAIN PANCREATIC DUCT IN THE DOG: AN EXPERIMENTAL MODEL OF THE ISOLATED SPHINCTERIC PREPARATION. (Eng.) Sankaran, H.; FitzGerald, O.; McGeeney, K. F. (Dept. Medicine and Therapeutics, Univ. Coll., Dublin, Ireland). *Digestion* 17(3):221-228; 1978.

An *in vitro* experimental model of the sphincter at the lower end of the main pancreatic duct was developed in dogs. This model, employing a drop counter to measure the drop rate, monitors the perfusion rate of Tyrode through the sphincter. Acetylcholine (ACh; 25, 50, 100, and 200 μg), employed to establish the sensitivity and viability of the isolated sphincter, produced a contraction of the sphincter that was concentration-response related (the drop rate was reduced by 16, 22, 26, and 30%, resp.). Physiological saline, as a control, atropine (50 μg), and hexamethonium (50 μg) did not affect the drop rate. Atropine (20 μg) partially abolished the contraction produced by 50 μg of ACh; hexamethonium (50 μg) did not have an effect. Cerulein (50 μg) produced a relaxation of the sphincter; epinephrine (50 μg) produced a contraction. Both sympathetic and parasympathetic mechanisms seem to play a role in the regulation of sphincteric activity of the main pancreatic duct in dogs.

5883 CONTROL OF LOWER-ESOPHAGEAL-SPHINCTER CONTRACTILE ACTIVITY BY MOTILIN IN CONSCIOUS DOGS. (Eng.) Itoh, Z.; Aizawa, I.; Honda, R.; Hiwatashi, K.; Couch, E. F. (Gunma Univ. Sch. Medicine, Maebashi, Japan 371). *Am. J. Dig. Dis.* 23(4):341-345; 1978.

To investigate whether the lower esophageal sphincter (LES) contractions in the interdigestive state may be controlled by motilin, the effect of synthetic motilin on contractile activity in the LES and in the stomach was studied in five healthy dogs by means of chronically implanted strain gauge force transducers. Motilin produced strong contractions in the LES and the stomach simultaneously after i.v. doses ranging from 0.3 to 2.7 μg/kg/hr, which were similar to the naturally occurring interdigestive contractions in the LES and the stomach. However, these contractions could be induced only in the interdigestive state; motilin infusion in the digestive state brought about no significant effect on either the LES or the stomach. Motilin-induced contractions in the LES and the stomach were instantly abolished by food ingestion. It is considered that the contractions induced by motilin are identical with the naturally occurring interdigestive contractions in the LES and that these contractions are the most orad component of the interdigestive cyclic recurring caudad-moving bands of strong contractions in the dogs.

5884 MORPHOLOGICAL ASPECTS OF BILIARY DYNAMICS [Abstract]. (Eng.) Kyosola, K.; Rechardt, L. (No affiliation given). *Acta Anat.* 99(3): 287; 1977.

5885 HOW NOW ESOPHAGEAL PERISTALSIS? (Eng.) Diamant, N. E. (Toronto Western Hosp., 399 Bathurst St., Toronto, Ontario M5T 2S8, Canada). *Gastroenterology* 73(6):1453-1454; 1977.

5886 CONTRIBUTION OF SYMPATHO-ADRENAL SYSTEM TO THE GASTRIC MOVEMENT OF RATS SUBJECTED TO RESTRAINT AND WATER IMMERSION STRESS. (Eng.) Yano, S.; Akahane, M.; Harada, M. (Faculty Pharmaceutical Sciences, Chiba Univ., Chiba 280, Japan). *Jpn. J. Pharmacol.* 27(5):635-643; 1977.

5887 UPPER ESOPHAGEAL SPHINCTER RESPONSE TO INTRA-ESOPHAGEAL FLUIDS IN MAN [Abstract]. (Eng.) Gerhardt, D. C.; Shuck, T.; Bordeaux, R. A.; Winship, D. H. (Dept. Medicine, Univ. Missouri, Columbia, MO 65201). *Gastroenterology* 72(5, Part 2):1062; 1977

5888 HORMONAL REGULATION OF GASTRIC MUCOSAL POTENTIAL DIFFERENCE IN MAN. EFFECT OF GLUCAGON, SECRETIN, CALCITONIN AND PENTAGASTRIN [Abstract]. (Eng.) Tarnawski, A.; Ivey, K. J. (Veterans Admin. Hosp., Columbia, MO). *Gastroenterology* 72(5, Part 2):1138; 1977.

See also, 6018, 6025, 6035, 6069, 6114, 6117, 6118, 6125, 6126, 6156, 6244, 6273, 6538.

SECRETION AND METABOLISM

5889 THE NEWER GUT HORMONES: CELLULAR SOURCES, PHYSIOLOGY, PATHOLOGY, AND CLINICAL ASPECTS. (Eng.) Pearse, A. G. E.; Polak, J. M.; Bloom, S. R. (Hammersmith Hosp., Ducane Rd., London W12 OHS, England). *Gastroenterology* 72(4, Part 1): 746-761; 1977.

5890 VASOACTIVE PEPTIDES AS MEDIATORS OF INCREASED VASCULAR PERMEABILITY. (Eng.) Greenbaum, L. M. (Coll. Physicians and Surgeons, Columbia Univ., New York, NY 10032). *Trends Biochem. Sci.* 2(1):41-43; 1977.

5891 EFFECTS OF SYNTOCINON ON VIP, INSULIN AND GASTRIN [Abstract]. (Eng.) Ebeid, A. M.; Escourrou, J. C.; Murray, P.; Cook, R.; Fischer, J. E. (Massachusetts General Hosp., Boston, MA). *Gastroenterology* 72(5, Part 2):1055; 1977.

5892 CONTINUOUS OESOPHAGEAL pH RECORDING AND ACID-CLEARING TEST. A STUDY OF REPRODUCIBILITY. (Eng.) Boesby, S. (Odense Univ. Hosp., DK-5000 Odense, Denmark). *Scand. J. Gastroenterol.* 12(2):245-247; 1977.

5893 MOLECULAR PROPERTIES OF THE NERVE GROWTH FACTOR SECRETED IN MOUSE SALIVA. (Eng.) Murphy, R. A.; Saide, J. D.; Blanchard, M. H.; Young, M. (Massachusetts General Hosp., Boston, MA). *Proc. Natl. Acad. Sci. USA* 74(7):2672-2676; 1977.

5894 EFFECTS OF PARATHYROID HORMONE ON TOTAL PROTEIN, CALCIUM, MAGNESIUM, PHOSPHORUS, SODIUM AND POTASSIUM CONCENTRATIONS OF NORMAL HUMAN PAROTID SALIVA. (Eng.) Schneider, P.; Paunier, L.; Sizonenko, P. C.; Wyss, M. (Clinique Universitaire de Pediatrie, 30 Bd de la Cluse, 1211 Geneva 4, Switzerland). *Eur. J. Clin. Invest.* 7(2):121-126; 1977.

5895 THE RELATIONSHIP BETWEEN STIMULATION-INDUCED POTASSIUM RELEASE AND AMYLASE SECRETION IN THE MOUSE PAROTID. (Eng.) Petersen, O. H.; Gray, T. A.; Hall, R. A. (Dept. Physiology, Univ. Dundee, Dundee DD1 4HN, England). *Pfluegers Arch.* 369(3):207-211; 1977.

See also, 5848, 5849, 5850, 5944, 6319, 6524, 6525.

SECRETION AND METABOLISM

Stomach

5896 EFFECT OF ETHANOL ON CANINE GASTRIC EPITHELIAL ULTRASTRUCTURE AND TRANSMUCOSAL POTENTIAL DIFFERENCE. (Eng.) Eastwood, G. L.; Erdmann, K. R. (Univ. Massachusetts Medical Sch., 55 Lake Ave. North, Worcester, MA 01605). *Am. J. Dig. Dis.* 23(5):429-435; 1978.

Changes in the gastric transmucosal potential difference (PD), as an indicator of the integrity of the gastric mucosal barrier, were correlated with morphological evidence of injury in dogs that had received either intragastric saline or 5, 10, 15, or 30% ethanol. Progressively greater decreases in PD occurred after 10, 15, and 30% ethanol, resp. The drop in PD became significant 2 min after the installation of 10% ethanol and 1 min after 15 and 30% ethanol. Increasing degrees of morphological damage were accompanied by greater, more rapid changes in PD. Furthermore, ultrastructural changes occurred within surface epithelial cells, not in the deeper parietal or zymogen cells, and initially did not involve disruption of the apical cell membrane. Typically, the tight junctions also were not affected, although in a minority of dogs, small bleblike separations of the tight junctions were seen. The authors consider the gastric mucosal barrier to be represented morphologically by the interconnecting sheet of gastric epithelial cells and that ethanol breaks the barrier by first causing intracellular injury.

5897 GASTRIC SECRETORY RESPONSE TO INTRAVENOUS AMINO ACIDS IN EVISCERATED DOGS. (Eng.) Mariano, E. C.; Landor, J. H. (New Jersey Rutgers Medical Sch., Piscataway, NJ). *Arch. Surg.* 113(5): 611-614; 1978.

Eight dogs, four with intact vagi and four with vagotomy, were studied to see if the gastric secretory effect of i.v. administered L-amino acids is mediated by a gastrointestinal hormone or hormones. Amino acid infusion produced a significant secretory response in denervated stomachs (from 19.6 µEq/hr to 208 µEq/hr, $p<0.005$) and in innervated stomachs (from 157 µEq/hr to 943 µEq/hr, $p<0.025$). When the known sites of formation of gastrointestinal hormones were removed by resection of antrum, duodenum, pancreas, jejunum, ileum, and colon, the gastric stimulatory effect of amino acids was not changed significantly in denervated stomachs but was greatly increased in innervated stomachs ($p<0.025$). It is concluded that amino acids have a direct effect on parietal cell secretion that is not dependent on the intermediary release of a stimulatory hormone, and that evisceration enhances this effect in dogs with intact vagi.

5898 OXYGEN CONSUMPTION DURING CIMETIDINE AND PROSTAGLANDIN E_2 INHIBITION OF ACID SECRE-

TION. (Eng.) Cheung, L. Y.; Moody, F. G.; Larson, K.; Lowry, S. F. (Washington Univ. Sch. Medicine. 4960 Audubon Ave., St. Louis, MO 63110). *Am. J. Physiol.* 234(5):E445-E450; 1978.

Changes in oxygen consumption were determined during cimetidine and 16,16-dimethyl prostaglandin E_2 (PGE_2) inhibition of acid secretion in exteriorized segments of the greater curvature of dog stomach. Acid secretion was stimulated with an i.v. infusion of histamine (1.0 µg/kg/min) in five groups of dogs; the four experimental groups received cimetidine (50 µg/kg/min, i.v.), PGE_2 (0.4 µg/kg/min, i.v., or 25 µg/period, luminally), or thiocyanate (2.5 mg/kg/min, i.v.) during the histamine infusion. Steady-state acid secretion during histamine infusion correlated well with O_2 consumption ($r=0.85$, $p<0.01$). Cimetidine and PGE_2 inhibition of acid secretion produced a reduction of oxygen consumption to resting levels. In contrast, oxygen consumption did not decrease appreciably during thiocyanate inhibition of acid secretion. These observations suggest that the inhibitory action of cimetidine and PGE_2 precedes, whereas that of thiocyanate is at a point beyond, the transfer of energy to the process of acid production.

5899 THE EFFECT OF CIMETIDINE ON STRESS ULCERS.

(Eng.) Sufian, S.; Sugimachi, K.; Leahy, J.; Matsumoto, T. (Hahnemann Medical Coll. and Hosp., 230 N. Broad St., Philadelphia, PA 19102). *Int. Surg.* 63(3):143-146; 1978.

The effect of cimetidine on stress ulcers was studied in male Wistar rats with ulcers induced by cold and restraint. The animals were divided into six groups: group I (5 rats), no stress, no treatment; group II (50 rats), stressed but no treatment; group III (10 rats) pretreated with saline then stressed; group IV (10 rats) pretreated with antacid then stressed; group V (40 rats) pretreated with cimetidine (40 µg/kg), then stressed; and group VI (20 rats) stressed then treated with cimetidine. Ulcers less than 1 mm were not considered as countable results. Ulcers occurred in the glandular portion of the stomach and were frequently associated with hemorrhage and edema. In group II, 96% of the rats developed ulcers compared to none in group I. The severity of the ulcer for group II was calculated as 2.2 on a scale of 0 to 3 (0; 1-15; 16-30; or >30 ulcers, resp.). Pretreatment with saline or antacid (groups III and IV) had no protective value; all rats in both groups developed ulcers. The severity of the ulcers was slightly lower in the antacid treated (1.9) compared with the saline treated group (2.5). Thirty-four percent in group V and 65% in group VI developed ulcers. In group V, the incidence of ulcers was markedly reduced, and the severity of the ulcer (0.5) was markedly less. Post-treatment with cimetidine decreased the severity (1.2) more than in other groups but was not as effective as pretreatment. Cimetidine seems to be very effective in preventing stress-induced ulcers in rats when instilled in the stomach prior to the stress.

5900 A PHYSIOLOGICAL ROLE FOR LUMINAL GASTRIN?

(Eng.) Fiddian-Green, R. G.; Farrell, J.; Havlichek, D., Jr.; Kothary, P.; Pittenger, G. (Univ. Michigan Medical Center, Ann Arbor, MI 48109). *Surgery* 83(6):663-668; 1978.

The possibility that luminal gastrin might participate in the physiological control of acid secretion was examined in 45 healthy subjects. Exogenous gastrin was infused into the lumen of the stomach in concentrations (100, 200, and 400 pg/ml) that previously had been detected as immunoreactive gastrin (IRG) in gastric juice, and the secretory responses were monitored with the intragastric titration technique. Exogenous luminal gastrin induced a dose-related increase in the background secretory response to gastric distention with water ($p<0.001$). The secretory responses to exogenous gastrin were accompanied by the disappearance of the gastrin from gastric juice ($p<0.001$) and, in some circumstances, by the appearance of IRG in the circulation ($p<0.005$). Inhibition of the secretory response to distention with water, induced by substituting saline for water or by administering Boots' secretin, was accompanied by the appearance of endogenous IRG in gastric juice ($p<0.05$). Recovery in secretory rate, after these inhibitory stimuli, was accompanied by the disappearance of the endogenous IRG from gastric juice ($p<0.05$), just as the secretory response to exogenous gastrin had been accompanied by the disappearance of exogenous gastrin from gastric juice. The inhibitory stimuli did not alter the concentrations of IRG in serum. These data suggest that luminal gastrin may participate in the physiological control of acid secretion.

5901 INFLUENCE OF VAGUS ON MECHANISMS FOR STIMULATION AND INHIBITION OF GASTRIN RELEASE.

(Eng.) Schafmayer, A.; Teichmann, R. K.; Swierczek, J. S.; Rayford, P. L.; Thompson, J. C. (Univ. Gottingen, Gottingen, W. Germany). *Surgery* 83(6):711-716; 1978.

To clarify the means by which vagotomy influences gastrin release, the gastrin response to food, bombesin (1 µg/kg/hr), and somatostatin (2.5 and 5.0 µg/kg/hr) plus food was determined in dogs before and after truncal vagotomy. Vagotomy caused an increase in basal gastrin levels and in gastrin release after bombesin and food (from 49 ± 5 to 80 ± 5 pg/ml, $p<0.05$; from 51.4 to 193.4 ng/min/ml, $p<0.05$; and from 15.2 to 19.6 ng/min/ml, $p<0.05$, resp.). Vagotomy augmented somatostatin suppression of food-stimulated gastrin release in a dose-dependent manner. The authors suggest that vagotomy causes a loss of both stimulatory and inhibitory vagal effects on gastrin release. Loss of vagal inhibition results in increased gastrin release to bombesin and food. Loss of vagal stimulation results in intensification of somatostatin-induced inhibition of postprandial gastrin release.

5902 CHARACTERISTICS AND TACHYPHYLAXIS OF GASTRIN-STIMULATED GASTRIC ACID SECRETION IN

THE CAT. (Eng.) Hirst, B. H.; Labib, L. A.; Reed, J. D. (Medical Sch., Univ. Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU, England). *J. Physiol. (Lond.)* 276:1-11; 1978.

To determine the effects of tachyphylaxis of acid secretion on the shape of the dose-response curve to pentagastrin and on maximum acid secretion in response to pentagastrin, conscious cats were fitted with chronic cannulated gastric fistulae and subjected to single- and multiple-dose assay systems. There was a significant positive correlation (r=0.557) between the peak acid secretion in response to pentagastrin (8 μg/kg/hr) and body weight; male cats, which were heavier, secreted significantly greater amounts of acid in response to pentagastrin than females. The difference was lessened, but not eliminated, by expressing the acid output in terms of body weight. Pentagastrin stimulated a dose-dependent increase in acid secretion in the range 0.5-32 μg/kg/hr when the response to each dose was assayed on separate occasions. Pentagastrin (64 μg/kg/hr) did not produce a further increase in acid secretion. The acid response to pentagastrin (1-16 μg/kg/hr) assayed on a single occasion by a continuous infusion method showed a dose-response relationship up to 8 μg/kg/hr where it reached a plateau of secretion. There was no difference between the two methods of assaying the gastric acid-stimulating activity using doses of pentagastrin up to 8 μg/kg/hr. The acid secretion in response to pentagastrin (8 μg/kg/hr) reached a maximum after 45 min of stimulation and thereafter showed tachyphylaxis. Over a 5-hr period, there were at least two phases of tachyphylaxis distinguishable. During the period of 0.75-2.5 hr of stimulation, there was a fast phase of tachyphylaxis (-32.0 μEq H^+/kg/15 min). This was followed by a slow phase of tachyphylaxis (-9.4 μEq H^+/kg/15 min), 2.75-5 hr of stimulation. The absolute rate of the fast phase of tachyphylaxis of acid secretion (μEq H^+/kg/15 min) increased with increasing doses of pentagastrin, but the rates of tachyphylaxis were similar when expressed as a percentage of the peak acid response to the particular dose of pentagastrin (5.1-7.8%/15 min). Synthetic human gastrin-17, the synthetic C-terminal decapeptide of human gastrin, and the C-terminal tetrapeptide of gastrin elicited comparable rates of tachyphylaxis. Two possible receptor models for the tachyphylaxis of gastrin-stimulated acid secretion, seen in other biological systems, are discussed: an allosteric model proposing the existence of a second receptor site with progressive occupation, leading to desensitization of the stimulatory receptor site and a model that proposes an agonist-induced conformational change in the receptor that is incompatible with further activation.

5903 EFFECT OF GLUCOCORTICOIDS ON GASTRIN SECRETION IN MAN. (Eng.) Seino, S.; Seino, Y.; Matsukura, S.; Kurahachi, H.; Ikeda, M.; Yawata, M.; *et al.* (Kobe Univ. Sch. Medicine, Kusunoki-cho, Ikuta-ku, Kobe, Japan). *Gut* 19(1):10-13; 1978.

To investigate the acute and chronic effects of glucocorticoids on plasma gastrin levels, plasma gastrin levels were measured by radioimmunoassay in 6 patients with Cushing's syndrome, 10 patients on long-term treatment with glucocorticoids (total dose >500 mg for >3 weeks), 11 normal subjects on short-term glucocorticoid treatment (30 mg/day, 3 days, p.o.), and 45 normal controls. The fasting plasma gastrin levels in the patients with Cushing's syndrome and in those on long-term steroid treatment (105 ± 20 pM and 73 ± 10 pM, resp.) were significantly higher than those in the untreated normal subjects and those on short-term therapy (43 ± 2 pM and 43 ± 3 pM, resp., $p<0.01$). The plasma gastrin response to food was tested in six normal untreated subjects, six patients on short-term treatment, and six patients on long-term treatment. The mean basal and 30-min postprandial plasma gastrin levels in the patients on long-term therapy (74 ± 10 pM and 231 ± 41 pM, resp.) were significantly higher than the corresponding values in untreated normal subjects and those on short-term steroid treatment ($p<0.05$). The i.v. infusion of 250 or 500 mg of hydrocortisone had no significant influence on gastrin secretion in five normal subjects. The results suggest that chronic exogenous or endogenous excess of glucocorticoids leads to hypergastrinemia, whereas an acute excess has no significant influence on gastrin secretion.

5904 DISTRIBUTION OF PROSTAGLANDIN-SENSITIVE ADENYLATE CYCLASE IN HUMAN UPPER GASTROINTESTINAL TRACT. (Eng.) Simon, B.; Kather, H. (Medizinische Universitatsklinik, Bergheimerstrasse 58, D-6900 Heidelberg, W. Germany). *Digestion* 17 (3):264-267; 1978.

The topographical distribution of the prostaglandin-sensitive adenylate cyclase in the upper gastrointestinal tract was studied in human biopsy specimens. The prostaglandin-sensitive enzyme was almost evenly distributed throughout the fundic, antral, and duodenal mucosa. The enhancement of enzyme activity in the presence of a maximally effective prostaglandin concentration (0.3 mM) exceeded basal levels by about 200%. The H_2-receptor blocking agent cimetidine (up to 50 mM) and the β-blocking agent propranolol (up to 50 mM) did not reduce the prostaglandin-sensitive enzyme system in contrast to their inhibitory effects on their respective agonists. The physiological role of the prostaglandin-sensitive adenylate cyclase in gastric and duodenal function, however, remains to be established.

5905 METHYLATED ANALOGUES OF PROSTAGLANDIN E_2 AND THE GASTRIC MUCOSAL BARRIER. (Eng.) Kenyon, G. S.; Ansell, I. F.; Carter, D. C. (Edinburgh Univ. Medical Sch., Edinburgh, Scotland). *Prostaglandins* 15(5):779-794; 1978.

The effects of 15(R)-methyl prostaglandin E_2 methyl ester (15 MPG) and 16,16-dimethyl prostaglandin E_2 methyl ester (16DMPG) on gastric mucosal permeability to Na^+ and H^+ were investigated in three male mongrel dogs prepared by antrectomy and construction of a vagally-denervated fundic pouch. It was also deter-

ed if the adverse effects that occur following
es of 16DMPG are of a magnitude liable to be
d clinically to suppress gastric secretion.
PG did not increase mucosal permeability to either
when given topically (18.75-300 μg) or i.v. (30
and did not affect permeability increases induced
topical 5 mM sodium taurocholate in acid solution.
MPG caused significant ($p<0.05$) increases in net
gain when given topically (18.75-75 μg) but did
affect net H^+ loss from the pouch lumen. Attempts
use higher doses of 16DMPG were abandoned because
bleeding from the pouch, and perforation in one
mal. It is conceivable that 16DMPG could cause
erse effects on the gastric mucosal barrier if
d to suppress gastric secretion therapeutically.
PG does not share this potentially harmful
perty and remains worthy of further study as
inhibitor of gastric secretion having thera-
tic promise.

06 EFFECTS OF INTRA-ARTERIAL INFUSION OF PROSTAGLANDIN E_1 ON GASTRIC SECRETION
BLOOD FLOW. (Eng.) Cheung, L. Y.; Lowry, S.
(Washington Univ. Sch. Medicine, 4960 Audubon
., St. Louis, MO 63110). *Surgery* 83(6):699-704;
8.

ce prostaglandin E_1 (PGE_1) is not only an effec-
e inhibitor of acid secretion but also a potent
odilator, it provides an opportunity to study
ssociative changes in gastric acid secretion and
od flow. The effect of intra-arterial infusion
PGE_1 on gastric total and mucosal blood flow
acid secretion was studied in an exteriorized,
mbered preparation of canine fundic stomach.
al gastric blood flow was measured simultaneously
venous outflow and by gamma-labeled microspheres.
cosal blood flow also was measured by microspheres.
intra-arterial infusion of PGE_1 at 1.0 μg/min
pletely inhibited histamine-stimulated acid se-
etion. This inhibition was accompanied by a sig-
ficant increase in both total ($p<0.01$) and mucosal
od flow ($p<0.01$). The ratio of mucosal to total
od flow remained unchanged during histamine (1.0
kg) stimulation (78 ± 4%) and PGE_1 (1.0 μg/min)
ibition (79 ± 4%). The results suggest that in-
ition of acid secretion can occur in the face of
reased blood flow. This observation is contrary
the generally accepted concept that inhibition
acid secretion always is associated with a de-
ease in mucosal blood flow.

07 STIMULATION OF MUCUS AND NONPARIETAL CELL SECRETION BY THE E_2 PROSTAGLANDINS. (Eng.)
lton, J. P.; Palmer, D.; Cohen, M. M. (Univ. Bri-
sh Columbia, 700 W. 10 Ave., Vancouver, British
lumbia V5Z 1L5, Canada). *Am. J. Dig. Dis.* 23(4):
9-364; 1978.

investigate the mechanism of the protective ac-
on of prostaglandin E_2 (PGE_2) on the rat gastric
cosa, the effects of PGE_2, 15-methyl prostaglandin
(15M), and 16,16-dimethyl prostaglandin E_2 (16DM)
gastric mucus and nonparietal cell secretion
re measured. Alcian blue binding was used as
a measure of gastric mucus. Applied topically, all three agents stimulated nonparietal cell secretion, and PGE_2 and 16DM stimulated the secretion of mucus ($p<0.01$), increasing the fraction in the gastric contents but not that adherent to the mucosa. Topical 15M did not stimulate the production of mucus. Given i.v., all three agents increased the amount of mucus in the gastric contents ($p<0.01$) without altering the amount of mucus bound to the mucosa. The prostaglandins had no effect on nonparietal cell secretion when given i.v. Topical application of each agent produced a highly significant ($p<0.01$) reduction in acid output. These effects could be relevant to the ability of the E_2 prostaglandins to protect the gastric mucosa from damage.

5908 EFFECTS OF E PROSTAGLANDINS ON CANINE GASTRIC POTENTIAL DIFFERENCE. (Eng.)

Dajani, E. Z.; Callison, D. A.; Bertermann, R. E. (Dept. Biological Res., Searle Lab., Box 5110, Chicago, IL 60680). *Am. J. Dig. Dis.* 23(5):436-442; 1978.

Measurement of the gastric transmucosal potential difference (PD) was used to study the effect of gastric antisecretory prostaglandins on the integrity of the gastric mucosa of the Heidenhain pouch dog. The intragastric administration of SC-29333 [(±)-15-deoxy-16-α,β-hydroxy-16-methyl PGE_1 methyl ester] at 10 and 30 μg/kg slightly but significantly increased the transmucosal PD when compared to vehicle control ($p<0.05$). In addition, SC-29333 administered either i.v. or intragastrically significantly inhibited the PD fall induced by aspirin ($p<0.05$). In contrast, the intragastric administration of 16,16-dimethyl PGE_2 methyl ester (Me-PGE_2) significantly lowered the transmucosal PD ($p<0.05$) and failed to modify the actions of aspirin on the integrity of the gastric mucosa. However, the i.v. administration of either prostaglandin did not affect the basal transmucosal PD values. These studies suggest that SC-29333 may strengthen the integrity of the gastric mucosal barrier against aspirin, and this effect could have important therapeutic potential.

5909 EFFECTS OF SYNTHETIC VASOACTIVE INTESTINAL PEPTIDE (VIP), SECRETIN AND THEIR PARTIAL SEQUENCES ON GASTRIC SECRETION. (Eng.)

Makhlouf, G. M.; Zfass, A. M.; Said, S. I.; Schebalin, M. (Medical Coll. Virginia, Richmond, VA 23298). *Proc. Soc. Exp. Biol. Med.* 157(4):565-568; 1978.

The effects of synthetic porcine vasoactive intestinal peptide (VIP) and secretin on pentagastrin-stimulated gastric secretion were compared in dogs with gastric fistulae. The infusion of both synthetic VIP (0.5 μg/kg/min, for 7.5 min) and synthetic secretin (0.05 μg/kg/min) produced a prompt inhibition of acid secretion, which reached a nadir in the first 30 min. VIP inhibited the maximal pepsin response by 65 ± 10% ($p<0.01$). The inhibition of pentagastrin-stimulated acid secretion by VIP was significantly greater at the lowest dose of pentagastrin (0.25 μg/kg/hr) than at the highest dose (16 μg/kg/hr, 57 ± 7% versus 23 ± 7%, $p<0.01$). Dose-response analysis (response versus response/dose) indicated that inhibition was of the competitive type. An apparent inhibitor dissociation constant for VIP was calculated to be 0.43 μg/kg/min. Percent inhibition of acid secretion by secretin did not vary with the dose of pentagastrin and was consistent with inhibition of the noncompetitive type. Carboxyl-terminal partial sequences of VIP and secretin, at approximately 10 times the molar doses of the parent peptides, had no detectable inhibitory effect. Synthetic VIP appears to be less effective than synthetic secretin, at least in terms of the doses required for an equivalent degree of inhibition of gastric secretion.

5910 COMPARISON OF GASTRIC RESPONSES TO SMALL INTESTINAL RESECTION AND BYPASS IN RATS. (Eng.) Bowen, J. C.; Paddack, G. L.; Bush, J. C.; Wilson, R. J.; Johnson, L. R. (Ochsner Clinic, 1514 Jefferson Highway, New Orleans, LA 70121). *Surgery* 83(4):402-405; 1978.

To clarify the divergent gastrin responses to small intestinal resection and bypass, male Sprague-Dawley rats were subjected to either 90% intestinal resection (n=10), 90% intestinal bypass (n=10), or a sham intestinal operation (n=10). After 8 weeks, fasting serum gastrin levels were increased significantly ($p<0.001$) in the resection group (36.6 ± 2.6 fmol/ml), as compared with the sham group (20.4 ± 2.4 fmol/ml) and the bypass group (23.3 ± 4.0 fmol/ml). Antral gastrin levels also were increased significantly ($p<0.01$) in the resection group (2.92 ± 0.09 nmol/g wet weight) but were not significantly different in the bypass group (2.55 ± 0.17 nmol/g) as compared with the sham group (2.43 ± 0.12 nmol/g). Oxyntic gland carbonic anhydrase followed the same pattern, i.e., increased significantly ($p<0.02$) in the resection group (44.3 ± 3.3 U/mg protein) but not significantly different in the bypass group (38.5 ± 2.4 U/mg protein) as compared with the sham group (33.8 ± 2.2 U/mg protein). Fundic pepsinogen activity was not significantly changed in either the resection or bypass groups; it was the only measured parameter that did not increase after small intestinal resection. The data show that, in contrast with jejunoileal bypass, massive small intestinal resection in the rat causes a significant increase in serum gastrin with concomitant trophic changes in the stomach. It is concluded that the small intestine is an important regulator of gastric function, even when removed from intestinal continuity and left *in situ* by intestinal bypass.

5911 PLASMA GASTRIN LEVELS FOLLOWING DIETARY PROTEIN STIMULATION. (Spa.) Varas Lorenzo, M. J.; Luque Gonzalez, M. T. (Hospitalet de Llobregat, Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 51(4):363-380; 1977.

5912 ^{14}C-HISTAMINE BINDING TO PLASMA MEMBRANES OF RAT GASTRIC MUCOSA CELLS. (Rus.) Bersimbaev, R. I. (Inst. Cytology and Genetics, Siberian Branch Acad. Sciences USSR, Novosibirsk, USSR) *Vopr. Med. Khim.* 22(6):728-732; 1976.

5913 DYNAMICS OF GASTRIC SECRETION IN RESPONS TO HISTAMINE STIMULATION FOLLOWING ANTRE TOMY IN DOGS. (Rus.) Zubenko, Iu. M.; Fisher, A. A.; Poliak, R. I. (Dept. Operative Surgery, Stavropol Medical Inst., Stavropol, USSR). *Patol. Fizio Eksp. Ter.* 4:78-80; 1976.

5914 HEALING OF STRESS-INDUCED GASTRIC ULCER BY HISTAMINE AND PLACEBO TREATMENT. (Ge Halter, F.; Barbezat, G. O.; Van Hoorn-Hickman, R. Van Hoorn, W. (Gastrointestinal Clinic, Univ. Cape Town, Cape Town, South Africa). *Z. Gastroenterol.* 15(10):618-619; 1977.

5915 CHANGES IN THE ACETYLCHOLINE CONTENT AND IN THE CHOLINESTERASE ACTIVITY IN THE GA TRIC TISSUES FOLLOWING INDUCTION OF "STEROID" GASTRIC ULCERS IN ANIMALS. (Rus.) Bondarenko, Iu. I (Dept. Pathophysiology, Ternopol Medical Inst., Ternopol, USSR). *Patol. Fiziol. Eksp. Ter.* (2):83 84; 1977.

5916 ACUTE EROSIVE GASTRITIS INDUCED BY L-DOP KETOPROFEN AND IBUPROFEN IN THE RAT [Abstract]. (Eng.) Mann, N. S. (Veterans Admin. Hos Louisville, KY). *Gastroenterology* 72(5, Part 2): 1094; 1977.

5917 MECHANISM UNDERLYING THE INFLUENCE OF PHENTOLAMINE, AN α-ADRENOBLOCKING AGENT, ON GASTRIC SECRETION IN DOGS. (Rus.) Korshak, A. L. (Dept. Pharmacology and Experimental Pathology of the Digestive Tract, Kiev Univ., Kiev, USSR). *Farmacol. Toksikol.* 39(6):678-680; 1976.

5918 INFLUENCE OF PHYSICAL LOAD ON BASAL GASTRIC SECRETION. (Ger.) Markiewicz, K.; Cholewa, M.; Gorski, L.; Chmura, J. (Institut fur Innere Medizin, Medizinische Akademie Lodz, Lodz, Poland). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(2): 73-77; 1977.

5919 CHLORIDE ION TRANSPORT IN THE PARIETAL CELLS OF GASTRIC MUCOSA: ELECTRON MICRO SCOPIC, HISTOCHEMICAL, AND AUTORADIOGRAPHIC STUDY. (Rus.) Morozov, I. A. (Inst. Nutrition, USSR Acad Medical Sciences, Moscow, USSR). *Biull. Eksp. Bio Med.* 84(7):29-32; 1977.

5920 NEUTRALIZING EFFECTS OF A CALCIUM-FREE A A CALCIUM-CONTAINING ANTACID. (Ger.) Weingart, J.; Haase, W.; Ottenjann, R. (Stadt. Kra kenhaus Munchen-Neuperlach, Oskar Maria Graf-Ring 51, 8 Munchen 83, W. Germany). *Fortschr. Med.* 95(2681-2684; 1977.

921 THE EFFECT OF CALCITONIN ON STRESS ULCERS IN THE RAT. (Ger.) Hofbauer, F.; Jakesz,
.; Lehr, L.; Schiessel, R. (I. Chirurgische Univer-
itatsklinik, Alser Strasse 4, A-1090 Vienna, Aus-
ria). *Z. Exp. Chir.* 10(5):297-300; 1977.

922 PHYSIOLOGY AND PATHOPHYSIOLOGY OF GASTROINTESTINAL HORMONES OF THE GASTRIN AND
ECRETIN GROUP. PART II: CHOLECYSTOKININ-PANCREO-
YMIN AND SECRETIN GROUP. (Ger.) Hausamen, T. U.;
ritsch, W. P. (Stadt. Kliniken Dortmund, Beurhaus-
trasse 40, 4600 Dortmund, W. Germany). *Z. Gastro-*
nterol. 15(5):320-336; 1977.

923 GASTROINTESTINAL HORMONES. PART I. GASTRIN. (Swe.) Bergstrom, P. (No affilia-
ion given). *Sven. Farm. Tidskr.* 80(11/12):385-
99; 1976.

924 GASTRIN, ITS MECHANISM OF ACTION AND REGULATION. (Fre.) Bonfils, S. (INSERM, U-10,
opital Bichat, 170, boulevard Ney, 75877 Paris
edex 18, France). *Actual. Pharmacol. (Paris)* (28):
5-86; 1977.

925 ANTISECRETORY AND CYTOPROTECTIVE EFFECTS OF PROSTACYCLIN (PGI_2) [Abstract]. (Eng.)
obert, A.; Hanchar, A. J.; Lancaster, C.; Nezamis,
. E. (Upjohn Co., Kalamazoo, MI 49001). *Fed.*
roc. 37(3):460; 1978.

926 GASTRIC ANTISECRETORY ACTIONS OF PROPANTHELINE BROMIDE AND METIAMIDE IN CONSCIOUS
HESUS MONKEYS [Abstract]. (Eng.) Callison, D. A.;
ajani, E. Z.; Bianchi, R. G. (Searle Lab., P.O.
ox 5110, Chicago, IL 60680). *Fed. Proc.* 37(3):
60; 1978.

927 GASTRIC ANTISECRETORY AND ANTIULCER EFFECTS OF P-CHLOROMERCURIBENZENESULFONATE
PCMBS) IN RATS [Abstract]. (Eng.) Ellert, M.; Solberg, L. A., Jr. (Southern Illinois Univ. Sch. Medicine, Carbondale, IL 62901). *Fed. Proc.* 37(3): 696; 1978.

5928 HISTAMINE AND GASTRIN ARE NOT EQUAL STIMULANTS OF GASTRIC ACID SECRETION IN THE MONKEY [Abstract]. (Eng.) Trout, H. H., III; Harmon, J. W.; Lewis, C. D. (Walter Reed Army Inst. Res., Washington, DC 20012). *Fed. Proc.* 37(3): 459; 1978.

5929 INHIBITION OF VOLUME SECRETION IN FROG GASTRIC MUCOSA BY HYPOTONIC SOLUTION IN THE LUMEN [Abstract]. (Eng.) Durbin, R. P. (Univ. California, San Francisco, CA 94143). *Fed. Proc.* 37(3):459; 1978.

5930 EPISODIC GASTRIC ACID SECRETION IN RHESUS MONKEYS [Abstract]. (Eng.) Hamilton, B. E.; Brooks, L. A.; Natelson, B. H. (New Jersey Medical Sch., Newark, NJ). *Fed. Proc.* 37(3):459; 1978.

5931 EFFECT OF LIQUID DIETS ON GASTRIN LEVELS AND MUCOSAL GROWTH IN RATS [Abstract]. (Eng.) Sircar, B.; Lichtenberger, L. M.; Johnson, L. R. (Univ. Texas Medical Sch., Houston, TX 77025). *Fed. Proc.* 37(3):373; 1978.

See also, 5845, 5848, 5886, 5889, 6022, 6078, 6150, 6156, 6177, 6178, 6181, 6189, 6510, 6524.

SECRETION AND METABOLISM

Pancreas

5932 EVIDENCE FOR PYLOROPANCREATIC REFLEX FOR PANCREATIC EXOCRINE SECRETION. (Eng.)
ebas, H. T.; Yamagishi, T. (Dept. Surgery, Univ.
British Columbia, Vancouver, Canada). *Am. J. Phys-*
iol. 234(5):E468-E471; 1978.

In seven dogs provided with an innervated pouch of the pyloric antrum, a gastric fistula, and a chronic pancreatic fistula, the effect of graded antral distention on pancreatic exocrine secretion was studied to gain information on the role of a gastropancreatic reflex in pancreatic secretion. The effect of antral distention was tested both when gastrin release was promoted (alkaline distention) and when gastrin release was blocked (acid distention). These studies were performed both before and after transthoracic truncal vagotomy. Graded alkaline antral distention caused graded rise in protein-rich pancreatic secretion ($p<0.05$ at 10 min; $p<0.001$ at 20, 30, and 40 min) and a graded increase in the concentration of serum immunoreactive gastrin. A similar pancreatic protein secretory response was also seen with graded acid distention, although this time no rise in serum gastrin concentration occurred. Pancreatic response to antral distention with either alkali or acid was completely inhibited by pretreatment of the animals with systemic atropine (0.2 mg/kg, s.c.). Truncal vagotomy reduced pancreatic response to alkaline antral distention by 90% but completely abolished pancreatic response to distention of the antrum with acid. These studies provide evidence for a pyloropancreatic reflex mechanism for pancreatic secretion that is cholinergic and requires intact long vagal pathways.

5933 EFFECT OF CONTINUOUS JEJUNAL PERFUSION OF ELEMENTAL AND COMPLEX NUTRITIONAL SOLUTIONS ON PANCREATIC ENZYME SECRETION IN HUMAN SUBJECTS. (Eng.) Vidon, N.; Hecketsweiler, P.; Butel, J.; Bernier, J. J. (INSERM U. 54, Hopital Saint-Lazare, Paris, France). *Gut* 19(3):194-198; 1978.

To determine the effect of jejunal perfusion of an elemental diet on pancreatic enzyme secretion, pancreatic lipase and chymotrypsin secretion in response to elemental diets and a crushed food homogenate was studied in 17 normal subjects. The solutions were infused at constant flow rates (2 ml/min for crushed food; 1, 2, and 3 ml/min for elemental diet) at the ligament of Treitz with polyethylene glycol as a nonabsorbable marker. A triple lumen tube was used, enabling collection of secretions at 35 and 70 cm from the infusion point. Pancreatic secretion of lipase and chymotrypsin was found to vary with the elemental diet flow rate. However, for the same caloric value, enzyme flow rate was greater with the crushed food homogenate than with the elemental diet. This rate was directly related to the nitrogenous load; the load was 13.89 ± 0.30 mg/min with the crushed food homogenate at 2 ml/min, whereas the values for the elemental diet at 1, 2, and 3 ml/min were 3.39 ± 0.05, 6.60 ± 0.12, and 10.17 ± 0.16 ml/min, resp. There was no significant difference between enzyme secretion with either diluted or undiluted elemental diet when the caloric value was kept constant. The results indicate that pancreatic enzyme secretion occurs in response to jejunal perfusion of both elemental diet and crushed food homogenate. Pancreatic enzyme secretion increases with the caloric and nitrogenous loads infused, but the volume or osmolality of the infused solution does not affect it. The findings imply that the only means of significantly reducing pancreatic secretion during the treatment of pancreatitis may be through parenteral feeding.

5934 EFFECTS OF A PROTEIN MEAL, INTRADUODENAL HCl, AND OLEIC ACID ON PORTAL AND PERIPHERAL VENOUS SECRETIN AND ON PANCREATIC BICARBONATE SECRETION. (Eng.) Boden, G.; Wilson, R. M.; Essa-Koumar, N.; Owen, O. E. (Temple Univ. Health Sciences Center, Philadelphia, PA 19140). *Gut* 19(4):277-283; 1978.

To determine the role of secretin in postprandial pancreatic water and bicarbonate secretion, the effect of a protein meal on immunoreactive secretin (IRS) concentration was studied in dogs and humans using a radioimmunoassay of improved sensitivity (8 pg/ml). After a 600-g protein meal, pancreatic bicarbonate secretion (PBS) in the dogs increased markedly during the first 15 min after feeding ($p<0.01$), and proximal duodenal pH decreased from 6.2 to 4.3 ($p<0.001$). Portal and peripheral IRS concentrations, however, remained unchanged in eight dogs and five patients with liver cirrhosis after ingesting a meal (meat in the dogs, mixed in the humans). An alkaline solution of sodium oleate (pH 9.2) stimulated PBS but not IRS when infused in dogs. Intraduodenal administration of various amounts of HCl in dogs demonstrated that acid-stimulated PBS was invariably accompanied by rises in peripheral venous IRS concentration. It is concluded that the postprandial stimulation of PBS involves mechanisms more complex than acid-stimulated secretin release.

5935 QUANTITATION OF ULTRASTRUCTURAL CHANGES IN MOUSE PANCREATIC ACINAR CELLS CAUSED BY FOREIGN SERUM. (Eng.) Nevalainen, T. J. (Lab. Electron Microscopy, Univ. Turku, Kiinamyllynkatu 10, SF-20520 Turku 52, Finland). *Exp. Cell Biol.* 46(4):193-198; 1978.

Quantitative changes in the pancreatic acinar cell organelles were observed in BALB/c mice injected i.p. with 1.0 ml fresh rabbit serum to study the mechanism by which serum initiates pancreatitis. Groups of five mice each were killed at 0, 1, 3, 6, and 12 hr after the serum injection. Pancreatic tissue was processed for electron microscopy by glutaraldehyde and osmium tetroxide fixation and Epon embedding. The proportions of acinar cell cytoplasm (volume fractions) occupied by zymogen granules, granular endoplasmic reticulum, Golgi apparatus, mitochondria, and lysosomes (including autophagosomes) were determined by the point counting method from electron micrographs. The volume fraction of lysosomes increased during the first 3 hr and remained markedly elevated up to 12 hr. The volume fractions of mitochondria and endoplasmic reticulum decreased slightly in 12 hr. The volume fraction of zymogen granules increased from 12% to 28% in 12 hr. It is concluded that the secretory mechanism of pancreatic acinar cells is injured by the foreign serum, and that this injury causes accumulation of zymogen granules and increas autophagic activity in the acinar cells.

5936 SECRETORY PATTERN AND PATHOLOGICAL STUDY OF THE PANCREAS OF STEROID-TREATED RATS. (Eng.) Bourry, J.; Sarles, H. (Unite de Recherches de Pathologie Digestive, U31, INSERM 46, chemin de la Gaye, 13009 Marseille, France). *Am. J. Dig. Dis* 23(5):423-428; 1978.

To gain information on the mechanism of steroid-induced pancreatitis, modifications of pancreatic secretion induced by prolonged administration of corticosteroids were studied in rats, and these physiological modifications were correlated with

ıe development of pancreatic lesions. Male Sprague-
wley rats received prednisolone (2.5 mg/kg/day)
drinking water during 1.5 to 12.5 months, and an
ual group of matched controls received water alone.
e most significant ($p<0.1$ due to the small sample
ze) pathological effects at 1.5-12.5 months of
eroids were dilatation of acini, flattening of
ct epithelium, and the presence of protein plugs
the ducts. The most significant ($p<0.05$) func-
onal modifications at 9-11 months of treatment
re increased concentration and output of proteins
th in basal and stimulated pancreatic secretion of
eroid-treated rats. This is very similar to the
sults observed previously in alcohol-induced pan-
eatitis. It is assumed that the hyperconcentra-
on could be at least partly responsible for pre-
pitation of proteins and the precipitate formation
r the lesions. For the large group of acute or
ronic pancreatic lesions characterized by the
rmation of protein plugs in the ducts, the term
tarrhal pancreatitis is proposed.

37 THE PERMEABILITY OF THE SECRETIN STIMULATED EXOCRINE PANCREAS TO NON-ELECTRO-
TES.

(Eng.) Dewhurst, D. G.; Hadi, N. A.; Hut-
n, D.; Scratcherd, T. (Dept. Physiology, Univ.
effield, Sheffield S10 2TN, England). *J. Physiol.
ond.)* 277:103-114; 1978.

method of measuring the permeability of the pan-
eas by determining the apparent reflection co-
ficient (σ^A) is described in the isolated cat
ncreas secreting maximally under the influence of
cretin. The principle is to add a nonelectrolyte
the perfusate that will create an osmotic gra-
ent ($RT\sigma\Delta C$) counter to that of active transport
d reduce the secretion rate. This effect is com-
red with that of an equal concentration (0.1 M)
sucrose ($RT\Delta C$, $\sigma=1$). The apparent reflection
efficient is obtained by dividing the percentage
duction in the secretion rate due to the test
lecule with that due to sucrose. For every 10-mM
crease in sucrose concentration in the perfusate,
e secretion rate was inhibited by 7.1%. It was
timated that an osmotic gradient of 131 mOsm/
water will cause zero flow rate. This gradient
a measure of the pressure required to counter-
t the local osmotic gradient set up by active
ansport and is equivalent to about 3.4 atmos-
eres. Nonelectrolytes with molecular volumes
eater than about 85 cm^3/mol were relatively
permeable; below this value, they entered the
ncreatic juice with increasing ease as the
lecular volume decreased. σ^A for urea was 0.17;
hanediol, 0.27; thiourea, 0.51; glycerol, 0.69;
eatinine, 0.81; erythritol, 0.91; arabinose, 0.96;
lose, 0.98; and sorbitol, 0.98. For molecules
th σ^A between 0.81 and 1.0, an osmotic load of
1 M increased both the concentration of sodium
us potassium and the concentration of chloride
us bicarbonate by about 50 mM. Whereas the
tion change was almost exclusively one of sodium,
at of the anions was preferentially an increase
chloride. For compounds with σ^A between 0 and
81, the concentration of sodium plus potassium
s proportional to σ^A. It is concluded that the
ncreas is more permeable than is the gallbladder
of rabbit, fish, and bullfrog, the proximal tubule of the kidney of rat and the small intestine of bullfrog, but is probably similar to that of the small intestine of guinea pig and man.

5938 THE EFFECT OF CALCITONIN ON SECRETIN-STIMULATED PANCREATIC SECRETION IN MAN.

(Eng.) Odes, H. S.; Barbezat, G. O.; Clain, J. E.; Bank, S. (Groote Schuur Hosp., Observatory, CP, 7925, South Africa). *S. Afr. Med. J.* 53(6):201-203; 1978.

The effect of a small dose of calcitonin on pancreatic secretion was studied in six healthy subjects to gain information concerning the use of calcitonin in the treatment of pancreatitis. After steady-state secretion was achieved with a constant i.v. infusion of secretin (2 μg/kg/hr), either calcitonin (0.16, and 0.32 μg/kg/hr) or 0.15 M NaCl was infused over 80 min. Calcitonin did not affect pancreatic volume output or bicarbonate concentration, but amylase concentration and output were significantly inhibited ($p<0.025$) in comparison with those in eight controls who received saline. The color index in the duodenal juice was unchanged by calcitonin. No changes were observed in blood glucose or serum calcium concentrations. The failure of calcitonin to suppress hyperamylasemia in patients undergoing endoscopic retrograde cholangiography suggests that its use in pancreatitis may be limited.

5939 INHIBITION OF PANCREATIC SECRETION BY ENKEPHALIN AND MORPHINE IN DOGS.

(Eng.) Konturek, S. J.; Tasler, J.; Cieszkowski, M.; Jawarek, J.; Coy, D. H.; Schally, A. V. (Inst. Physiology, 31-531 Krakow, ul. Grzegorzecka 16, Poland). *Gastroenterology* 74(5, Part 1):851-855; 1978.

The nature and extent of enkephalin- and morphine-induced inhibition of pancreatic bicarbonate and protein secretion were studied in dogs with chronic pancreatic fistulae after administering exogenous secretin (2.0 U/kg/hr or graded doses of 0.5-8.0 U/kg/hr) or an octapeptide of cholecystokinin (0.5 μg/kg/hr) and stimulants for the endogenous release of these hormones. Both enkephalin and morphine (each at 40 μg/kg/hr) competitively inhibited the pancreatic bicarbonate secretion induced either by exogenous secretin or duodenal acidification (by 36% with secretin; by 90% and 83% by enkephalin and morphine, resp., with acidification). This inhibition was partially reversed by naloxone (20 μg/kg/hr), an opiate antagonist. Opiate substances also profoundly inhibited pancreatic protein response to the octapeptide of cholecystokinin and to various stimulants of endogenous cholecystokinin release. It is concluded that enkephalin and morphine strongly inhibit the pancreatic responses to exogenous and endogenous stimulants by a mechanism involving separate opiate receptors.

5940 EFFECT OF CHRONIC PENTAGASTRIN, CHOLECYSTOKININ, AND SECRETIN ON PANCREAS OF RATS.

(Eng.) Petersen, H.; Solomon, T.; Grossman, M. I.

(Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *Am. J. Physiol.* 234(3):E286-E293; 1978.

The effects of long-term treatment with pentagastrin, cholecystokinin (CCK), or secretin on pancreatic secretion in response to secretin and CCK, on the volume of endocrine and exocrine tissue in the pancreas, and on the ratio of chief cells to parietal cells in the stomach were studied in rats. Pentagastrin (1.5 mg/kg), 20% pure natural CCK (37.5 Ivy dog U/kg) or secretin (25 µg/kg) was given in a depot carrier s.c. 3 times daily for 15 days. The dose of CCK and secretin was submaximal for pancreatic secretion, whereas the dose of pentagastrin was supramaximal for gastric acid secretion. The pancreatic wet weight increased by 12% ($p<0.01$) in the rats treated with pentagastrin, 57% ($p<0.001$) in those treated with CCK, and 9% ($p<0.01$) in those treated with secretin. In CCK-treated rats, the maximal protein and bicarbonate outputs in response to CCK increased proportionately to the increase in pancreatic weight, but maximal bicarbonate and protein outputs in response to secretin were unaltered. The secretin-treated rats showed a lowered basal secretion of bicarbonate and a lowered sensitivity to secretin stimulation, but the maximal bicarbonate and protein outputs to secretin and CCK were unchanged. Pentagastrin treatment produced no significant changes in pancreatic responses to secretin or CCK. No significant difference was found between any groups for the calculated total mass of islets per pancreas. None of the treatment groups varied from the controls with respect to the ratio of chief cells to parietal cells. It is concluded that (1) the increase in pancreatic weight produced by repeated injections of cholecystokinin was accompanied by a proportional increase in functional capacity as reflected by the increased maximal bicarbonate and protein outputs in response to cholecystokinin, and (2) repeated administration of secretin decreased the sensitivity of the pancreas to secretin without altering maximal bicarbonate response.

5941 EFFECT OF SOMATOSTATIN ON EXOCRINE PANCREATIC SECRETION STIMULATED BY PANCREOZYMIN-SECRETIN OR BY A TEST MEAL IN THE DOG. (Eng.) Kayasseh, L.; Gyr, K.; Stalder, G. A.; Rittmann, W. W.; Girard, J. (Kantonsspital, CH-4004 Basel, Switzerland). *Hormone Res.* 9(3):176-184; 1978.

To determine whether somatostatin inhibits stimulated exocrine pancreatic function in dogs, exocrine pancreatic function was assessed in four animals with chronic duodenal and gastric fistulae by cannulating the pancreatic duct and collecting the duodenal contents. Pancreatic secretion was stimulated by the infusion of 2 Crick-Harper-Raper U of pancreozymin and secretin or by the administration of a liquid test meal, injected into the stomach through the gastric fistula. During both experiments, 3.5 µg/kg somatostatin was given as bolus injection followed by an infusion of 3.5 µg/kg/hr. Somatostatin caused a significant reduction in protein and amylase output and in the bicarbonate concentration during stimulation with pancreozymin-secretin ($p<0.02$, $p<0.05$, and $p<0.05$, resp.). Volume and bicarbonate were slightly decreased but not to a significant extent. Duodenal volume and the duodenal activities of trypsin and amylase were significantly reduced during test meal stimulation and somatostatin infusion ($p<0.05$, $p<0.01$, and $p<0.01$, resp.). Somatostatin is a potent inhibitor of exocrine pancreatic function, mainly influencing enzyme secretion.

5942 COMPARATIVE STUDY OF PANCREATIC SECRETION COLLECTED BY DUODENAL TUBING AND BY CATHE TERISATION OF THE MAIN PANCREATIC DUCT UNDER THE SAME SECRETIN-CAERULEIN STIMULATION [Abstract]. (Eng.) Escourrou, J.; Frexinos, J.; Louis, A.; Ribet, A. (Service des Maladies de l'Appareil Digestif, C.H.U. de Rangueil, 31054 Toulouse Cedex, France). *Ir. J. Med. Sci.* 146(Suppl. 1):44-45; 1977.

5943 TRANSPORT OF PANCREATIC ENZYMES IN THE PANCREATIC JUICE, BLOOD AND LYMPH, FOLLOWING STIMULATION OF THE PANCREATIC GLAND [Abstract]. (Eng.) Ribera, M. T.; Gramatica, L. (Hosp. San Pablo, Barcelona, Spain). *Ir. J. Med. Sci.* 146(Suppl. 1):42; 1977.

5944 PANCREATIC ALPHA-AMYLASE INHIBITORS IN CEREALS. (Eng.) Marshall, J. J. (Howard Hughes Medical Inst., Miami, FL). *Carbohyd Res.* 57:C27-C30; 1977.

5945 PANCREATIC LIPASE EFFECTORS EXTRACTED FRO SOYBEAN MEAL. (Eng.) Widmer, F. (Res. Dept., Nestle Products Technical Assistance Co. Ltd., CH-1814 La Tour-de-Peilz, Switzerland). *J. Agr. Food Chem.* 25(5):1142-1145; 1977.

5946 THE SOURCES OF SODIUM IN RABBIT PANCREATI JUICE. (Eng.) Galey, W. R.; Caflisch, C R. (Univ. New Mexico Sch. Medicine, Albuquerque, NM 87131). *Proc. Soc. Exp. Biol. Med.* 156(1):35-39; 1977.

5947 THE ACTION OF BILE SALTS AND OTHER DETERGENTS ON PANCREATIC LIPASE AND THE INTERACTION WITH COLIPASE. (Eng.) Borgstrom, B. (Dept. Physical Chemistry, Univ. Lund, Lund, Sweden). *Biochim. Biophys. Acta* 488(3):381-391; 1977.

See also, 5846, 5889, 5996, 6015, 6019, 6055, 6324, 6410.

Hepatobiliary Tract

5948 PHARMACOCHOLANGIOGRAPHY. (Eng.) Burgener, F. A. (Univ. Rochester Sch. Medicine and Dentistry, Rochester, NY). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):135-137; 1978.

To improve i.v. cholangiography, the effect of ouabain and atropine on bile flow and bile iodine concentration in i.v. cholangiography was investigated in four cholecystectomized dogs with complete bile diversion under general anesthesia and compared with the effect of sodium taurocholate. Iodipamide was administered i.v. with an initial priming dose of 50 mg/kg followed by a constant infusion of 2 mg/min/kg. Ouabain in stepwise increasing infusion rates (0.0625-0.25 μg/min/kg) had no significant effect. Atropine infusion (1 to 8 μg/min/kg) increased the bile iodine concentration up to 19%, but a 14% increase with a 5% reduction in bile flow was found with the lowest atropine dose. The lowest taurocholate infusion rate (0.16 mg/min/kg) resulted in the highest bile iodine concentration and lowest bile flow. Each increment in the taurocholate infusion rate (0.32-5.12 mg/min/kg) resulted in a significant increase in bile flow when compared with the preceding value ($p<0.05$). It is suggested that atropine premedication and low bile salt plasma levels might improve the opacification of the biliary tree, particularly in hepatic dysfunction by selectively reducing specific fractions of the basal bile flow.

5949 UPTAKE OF MACROMOLECULES BY RAT KUPFFER CELLS IN VITRO. (Eng.) Munthe-Kaas, A. C. (Norwegian Radium Hosp., Montebello, Oslo 3, Norway). *Exp. Cell Res.* 107(1):55-62; 1977.

Studies were carried out to determine whether pinocytosis plays a significant role in the normal physiology of the liver macrophage. Pinocytosis was studied in cultured rat Kupffer cells by using colloidal ^{198}Au, ^{131}I-labeled serum albumin, and ^{3}H-labeled sucrose as test substances. The kinetics of uptake as well as electron microscopy indicated that colloidal gold was pinocytosed directly as part of the fluid medium without prior absorption to the cell membrane. This process was resistant to cytochalasin B (CB), colchicine, and metabolic inhibitors at concentrations where phagocytosis would have been totally inhibited, but was reduced to less than 10% by low temperature. These data suggest that colloidal gold was taken up by micropinocytosis. Serum showed an inhibitory effect on colloidal gold and albumin uptake, whereas it stimulated sucrose uptake. Sucrose uptake was also more sensitive to CB. Distinct processes of macropinocytosis and micropinocytosis, with separate control mechanisms, may be occurring simultaneously in these cells.

5950 ULTRASTRUCTURE OF ADULT RAT HEPATOCYTES CULTURED ON FLOATING COLLAGEN MEMBRANES. (Eng.) Sattler, C. A.; Michalopoulos, G.; Sattler, G. L.; Pitot, H. C. (Duke Univ. Sch. Medicine, Durham, NC). *Cancer Res.* 38(6):1539-1549; 1978.

The ultrastructure of primary hepatocytes cultured for 2 to 17 days on floating collagen membranes was evaluated to test the value of this new technique for long-term culturing. A pellet of the hepatic cell suspension used to inoculate the collagen membranes contained some single cells and many aggregates of two, three, or four cells. Desmosomes were split during the perfusion, but tight junctions and gap junctions remained intact. By 2 days in culture, the hepatocytes had formed a monolayer of cells of polygonal shape with newly synthesized desmosomes between cells. Since the flexible floating collagen membrane decreases in size as the monolayer forms, the hepatocytes do not flatten out, as is characteristic of cells cultured on a rigid substrate. Hepatocytes in culture for 10 days or less exhibited large lamellar arrays of rough endoplasmic reticulum, well developed Golgi complexes, and structures resembling bile canaliculi, which possess tight junctions and desmosomes separating them from the intercellular space. Microfilaments oriented parallel to the plasma membranes of adjoining cells and in an intermeshed network at the edge of the monolayer and beneath the plasma membrane bordering the medium increased in size and number in older cultures. After 17 days in culture, the cells maintained tight junctions, desmosomes, Golgi complexes, and rough endoplasmic reticulum in small lamellar stacks and in small vesicles. Since hepatocytes on the floating collagen membrane retain most of the subcellular structural elements characteristic of normally functioning hepatocytes for 2.5 weeks, this system may be valuable for future experiments involving drug metabolism and carcinogenesis *in vitro*.

5951 LIVER ORIGIN OF HEPATOTROPHIC FACTOR(S). (Eng.) Demetriou, A. A.; Levenson, S. M. (Vanderbilt Univ. Sch. Medicine, Nashville, TN). *Surg. Forum* 28:383-384; 1977.

The hypothesis that the liver remnant following 70% hepatectomy is the site of production of a hepatotrophic factor(s) was tested. The effect of "conditioned tissue culture media" on the growth of hepatocytes *in vitro* was tested. Conditioned media refers to media in which cells have been grown in culture and then removed; the media is then used to cultivate other cells and the growth rate is assessed. At various time intervals following either hepatectomy or sham operation in male Sprague-Dawley rats, the media from normal hepatocytes were substituted with conditioned media from other hepatocyte monolayer cultures derived from normal, sham-hepatectomized, and 70% hepatectomized rats. Eight hours following media substitution, tritiated thymidine was added for 60 min. Twelve-hour conditioned media from regenerating liver cells produced a significant ($p<0.001$) stimulation of tritiated thymidine incorporation into the DNA of normal hepatocytes in culture, whereas media conditioned with normal or sham-hepatectomy rat liver cells had no significant effect. Twelve-hour conditioned media from regenerating liver cells, when added to normal hepatocyte cultures, produced significant ($p<0.001$) stimulation of ornithine decarboxylase activity 4 hr later. These studies suggest that the hepatocytes derived from the regenerating liver remnant secrete a factor(s) into the culture medium that produces stimulation of the rate of thymidine incorporation into DNA.

5952 INTEGRATED STEREOLOGICAL AND BIOCHEMICAL STUDIES ON HEPATOCYTIC MEMBRANES. I. MEMBRANE RECOVERIES IN SUBCELLULAR FRACTIONS.

(Eng.) Bolender, R. P.; Paumgartner, D.; Losa, G.; Muellener, D.; Weibel, E. R. (Dept. Biological Structure, Univ. Washington, Seattle, WA 98195). *J. Cell Biol.* 77(2):565-583; 1978.

A stereological study was undertaken to estimate membrane surface areas in the intact tissue, homogenate, and fractions of the same rat livers and then to test the comparability of these data with membrane marker enzymes by calculating both morphological and biochemical recoveries. The stereological data were corrected for errors due to section thickness and compression. The average total membrane surface area per gram of liver was 9.3 m^2 in the intact tissue (T), 7.8 m^2 in the homogenate (H), and 7.4 m^2 in the fractions (F); recoveries for the membrane surface areas thus averaged 96% for the (F/H) and 81% for the (F/T) comparisons. In homogenate and fractions, the differentiability of membranes by morphological criteria was limited to rough- and smooth-surfaced membranes, as well as outer and inner mitochondrial membranes. The recoveries of rough-surfaced membranes were 101% for F/H and 92% for F/T; those of smooth-surfaced membranes were 89% for F/H and 107% for F/T. For mitochondrial membranes, a recovery of 100% for F/H was obtained, whereas it amounted to only 54% for F/T. With respect to F/H, the membrane recoveries compare well with the marker enzyme recoveries obtained biochemically. The extension of recovery calculations to the intact tissue (F/T) revealed satisfactory conservation of the procedures of homogenization and fractionation; it indicates, however, that a shift of a substantial part of mitochondrial membranes to the pool of unidentifiable smooth membranes may occur on homogenization.

5953 TECHNIQUES FOR ASSESSMENT OF BILIARY EXCRETION AND ENTEROHEPATIC CIRCULATION IN THE RAT.

(Eng.) Johnson, P.; Rising, P. A. (Hoechst Pharmaceutical Res. Lab., Walton Manor, Walton, Milton Keynes MK7 7AJ, England). *Xenobiotica* 8(1): 27-36; 1978.

Surgical cannulation of the bile duct of rats (Charles River, Sprague-Dawley, CD, and Wistar) was performed to permit analysis of compounds excreted in the bile, and a modification of the procedure is also described for assessment of the reabsorption and recirculation of biliary excreted compounds. The bile duct was cannulated proximal to the liver (approximately 2 cm) to prevent admixture of pancreatic juice with the bile, which was continuously collected in a glass vessel inserted into the peritoneal cavity. After at least 16 hr, with addition of glucose to the drinking water and communal housing, the rats recovered, i.e. their activity, food and fluid intake, and defecation were normal. It was determined that 6-10 ml bile/100 g body weight/24 hr should be collected when the procedure is successful. The four ^{14}C-labeled compounds (Fendosal, Isoxepac, C 72 0045, and HP 505) that were administered p.o. and i.p. in various doses to test the efficacy of the method were recovered at rate of >95% in all but a single case. Bile may be collected for up to 6 days after dosing. For use of the procedure to determine enterohepatic recirculation, a second cannula was used to infuse bile collected from a donor rat into the duodenum. Poor recoveries in total reactivity were attributed to the use of a restraining cage, which was deemed inadequate for collection of urine and feces; however, calculations are presented that allow good agreement between experimental values and values for combined biliary/urinary reabsorption The specific metabolic distribution before and after recirculation was determined by thin-layer chromatography. This technique of assessing biliary excretion and recirculation is quick, simple, gives a comprehensive profile, and has the major advantage of maintaining nearly normal experimental conditions because the rats remain mobile after the operation.

5954 LIVER SUPPORT SYSTEMS: THE LOW CLEARANCE OF MODEL HEPATIC EXCRETORY ANIONS BY CHARCOAL HEMOPERFUSION.

(Eng.) Hew, J. T.; Hart, F. E.; Willson, R. A. (Div. Gastroenterology, Univ. Washington, Seattle, WA). *Gastroenterology* 74(4): 661-663; 1978.

Because the adsorptive properties of charcoal are complex and its systematic evaluation for the removal of model compounds from plasma is not complete, the clearance of strongly protein-bound cholephilic anions was assessed by measuring the removal of unconjugated bilirubin, BSP, and indocyanine green (ICG) by charcoal hemoperfusion in normal dogs. None of these model excretory compounds was effectively removed by the charcoal columns. *In vitro* studies of BSP and ICG suggested that poor removal of the anions was related to albumin binding in that, when the anions were in molecular solution, their extraction by the charcoal column was high (extraction ratios of 0.92 and 0.79, resp.), whereas, when albumin was added, their extraction was negligible (extraction ratios of 0.06 and 0.10, resp.). Therefore, if the removal from plasma of strongly bound toxins is important in the treatment of acute hepatic failure, additional support devices may have to be encompassed into the ultimately successful hepatic support system.

5955 LACTATE-STIMULATED ETHANOL OXIDATION IN ISOLATED RAT HEPATOCYTES. (Eng.) Crow, K. E.; Cornell, N. W.; Veech, R. L. (Dept. Chemistry, Biochemistry, and Physics, Massey Univ., Palmerston North, New Zealand). *Biochem. J.* 172(1):29-36; 1978.

The mechanism of lactate stimulation of ethanol oxidation was investigated. Hepatocytes isolated from starved rats and incubated without other substrates oxidized ethanol at a rate of 0.8-0.9 μmol/min/g wet weight of cells. Addition of 10 mM lactate increased this rate twofold. Quinolinate (5 mM) or tryptophan (1 mM) decreased the rate of gluconeogenesis with 10 mM lactate and 8 mM ethanol from 0.39 to 0.04-0.08 μmol/min/g wet weight of cells, but rates of ethanol oxidation were not decreased. It appears that acceleration of ethanol oxidation by lactate is not dependent upon the stimulation of gluconeogenesis and the consequent increased demand for ATP. As another test of the relationship between ethanol oxidation and gluconeogenesis, the initial lactate concentration was varied from 0.5 mM to 10 mM, and pyruvate was added to give an initial [lactate]/[pyruvate] ratio of 10. This substrate combination gave a large stimulation of ethanol oxidation (from 0.8 to 2.6 μmol/min/g wet weight of cells) at low lactate concentrations (0.5-2.0 mM), but rates remained nearly constant (2.6-3.0 μmol/min/g wet weight of cells) at higher lactate concentrations (2.0-10 mM). In contrast, owing to the presence of ethanol, the rate of glucose synthesis was only slightly increased (from 0.08 to 0.12 μmol/min/g wet weight of cells) between 0.5 mM and 2.0 mM lactate and continued to increase (from 0.12 to 0.65 μmol/min/g wet weight of cells) with lactate concentrations between 2 and 10 mM. In the presence of ethanol, O_2 uptake increased with increasing substrate concentration over the entire range. Changes in concentrations of glutamate and 2-oxoglutarate closely paralleled changes in the rate of ethanol oxidation. In isolated hepatocytes, rates of ethanol oxidation are lower than those *in vivo*, apparently because of depletion of malate-aspartate shuttle intermediates during cell preparation. Rates are returned to those observed *in vivo* by substrates that increase the intracellular concentration of shuttle metabolites.

5956 ENDOGENOUS AND EXOGENOUS HEPTADECAPEPTIDE GASTRIN TRANSPORT ACROSS THE PIG LIVER. (Eng.) Vinik, A. I.; Hickman, R.; Grant, B. J. (Dept. Medicine, Univ. Cape Town, Cape Town, South Africa). *S. Afr. Med. J.* 53(19):759-765; 1978.

Gastrin transport across the pig liver was studied in the basal unstimulated state and after infusions of exogenous synthetic human gastrin. *In vivo* studies showed no net loss or gain of endogenous porcine gastrin during transport across the liver in fasting animals. Infusion of synthetic human heptadecapeptide gastrin (G-17, 0.25, 0.5, and 1.0 μg/kg/min) raised circulating gastrin levels to those found in the postprandial state. At no time was there a loss or gain of immunologically determined gastrin across the liver. Changes in the molecular size of gastrin, however, suggest that qualitative but not quantitative effects followed the administration of G-17 *in vivo*. The disappearance of gastrin from the circulation was biphasic, with an initial half-life of 3 min and a slower phase suggesting recirculation or multicompartment equilibration. The distribution at equilibrium was ±20% of body weight calculated from arterial levels, but 30-40% if portal or hepatic venous values were used. The mean blood production rate was ±125 μg/day, but the portal contribution was only 30 μg/day, suggesting an important alternative source of gastrin. It is concluded that the liver plays an unimportant role in the inactivation of immunoreactive G-17 gastrin.

5957 REGULATION OF HEPATIC SYNTHESIS OF PROTEINS BY THE CHRONOLOGY OF PROTEIN INGESTION. (Eng.) Lardeux, B.; Bourdel, G.; Girard-Globa, A. (Centre de Recherches sur la Nutrition du C.N.R.S., 9, rue Jules Hetzel, 92 190 Meudon-Bellevue, France). *Biochim. Biophys. Acta* 518(1):113-124; 1978.

To assess the direct influence of protein ingestion on protein synthesis, circadian variations in liver protein synthesis were assessed in control rats fed a mixed 10% protein diet and in rats fed proteins as a separate meal either at 09:00 (SF 09) or at 21:00 (SF 21) and provided with a protein-free diet *ad libitum*. Protein synthesis was measured by incorporation of labeled leucine over 15 min at timepoints regularly spaced over 24 hr. In controls, the circadian variations observed were of moderate amplitude (from 2.75 mg/hr/g at 09:00 to 5.77 mg/hr/g at 06:00) and correlated with increased protein and RNA contents of the liver. In separately fed animals, ingestion of the protein meal triggered a 300% increase in protein synthesis within 1 hr while the feeding pattern was unaltered. In the SF 09 group, high synthetic activity was not followed by an increase of hepatic protein content, while hepatic urea concentrations were sharply increased (40-100% above the 24-hr mean) and glucogenic amino acid pools were greatly depleted (-25% at 0.5 hr after the meal). It is suggested that the high influx of amino acids consecutive to the absorption of the dietary proteins is the key factor stimulating protein synthesis, while synchronization with the energetic metabolism controls the degree of degradation.

5958 REPLACEMENT OF THE EXTRAHEPATIC COMMON BILE DUCT IN THE DOG BY AN ELASTOMERE SILICONE PROSTHESIS: POSSIBLE APPLICATIONS IN BILIARY SURGERY. (Fre.) Kron, B. (Clinique Chirurgicale de Sartrouville, 20, avenue Maurice-Berteaux, 78500 Sartrouville, France). *J. Chir. (Paris)* 114(4):237-256; 1977.

A method of replacing the common bile duct with a silicone elastomere prosthesis was studied in 21 dogs. A sutureless, double intubation technique was used to replace a 4-cm length of the common bile duct with the silicone tube. One postoperative death was caused by the intraperitoneal migration of the prosthesis. The other animals remained in excellent health with no signs of hepatic or biliary dysfunction for up to 2.5 years, except for two dogs who showed severe digestive problems 3 and 6 months after surgery, resp. Autopsies showed minimal hepatic lesions in one dog and a beginning cirrhosis in the other. Radiological and biological parameters were normal in all but the latter two dogs and one other with a dilatation of the common bile duct. The prosthesis could be easily removed after 6 months by a simple short choledochotomy, leaving a patent, permeable neocholedochus with excellent function. These good results suggest the use of this prosthesis in man for stenosis or operative wounds of the bile ducts, using either a removable tutor prosthesis or a segmental prosthesis lost internally. In palliative surgery for biliary carcinoma, the prosthesis can bypass the diseased ducts and be implanted in the stomach, duodenum, or jejunum; it is eliminated internally. It should also be possible to use a silicone prosthesis in certain cases of congenital bile duct abnormalities.

5959 EFFECT OF AGING ON BILIARY LIPID COMPOSITION AND BILE ACID METABOLISM IN NORMAL CHILEAN WOMEN.

(Eng.) Valdivieso, V.; Palma, R.; Wunkhaus, R.; Antezana, C.; Severin, C.; Contreras, A. (Universidad Catolica de Chile, Escuela de Medicina, Marcoleta 347, Santiago, Chile). *Gastroenterology* 74(5, Part 1):871-874; 1978.

To determine the effects of age and of obesity on biliary lipid composition and bile acid metabolism, biliary lipid composition was determined in fasting gallbladder bile of 12 young (16-25 yr) and 12 elderly (>50 yr) asymptomatic Chilean women with normal weights and recent, normal cholecystograms and in four elderly, obese women with radiologically normal gallbladders. The proportion of biliary cholesterol and the lithogenic index were significantly higher in the 12 asymptomatic elderly women of normal weight than in the young women (6.9 ± 1.8% versus 10.6 ± 2.9% cholesterol, $p<0.001$; lithogenic index 0.72 ± 0.19 versus 1.07 ± 0.28, $p<0.001$). Moreover, supersaturated bile was present in 8.3% of the young and in 41.7% of the older women studied. Obesity was found to enhance the saturation of bile in older females: lithogenic bile was found in all four elderly, obese women. The bile acid pool and cholic acid metabolism were studied in five young and four older normal women. Both groups showed similar values of bile acid pool, cholic acid synthesis, and turnover. These results indicate that aging *per se* modifies the proportions of biliary lipids in Chilean women, and provide a partial explanation for the frequency of gallstones observed among them. The increment in the lithogenic index of gallbladder bile with age takes place without significant changes in bile acid metabolism, suggesting that the canalicular secretion of cholesterol increases with aging.

5960 THE HEPATOTOXICITY OF 3-AMINO-1,2,4-TRIAZOLE AND CARBON DISULPHIDE IN PHENOBARBITONE-TREATED STARVED RATS.

(Eng.) Magos, L.; Butler, W. H.; Snowden, R. (Medical Res. Council Toxicology Unit, Carshalton, Surrey, England). *Toxicology* 9(1/2):103-107; 1978.

Experiments were carried out in phenobarbitone-treated Porton-Wistar rats to determine if aminotriazole is hepatotoxic in phenobarbitone-induced animals, and to see whether, under the same experimental condition, it interferes with the hepatotoxic effect of CS_2. In phenobarbitone-treated (80 and 50 mg/kg at 0 and 6 hr, resp., i.p.) starve male Porton-Wistar albino rats, 3-amino-1,2,4-triazole (1 g/kg, i.p.) produced moderate liver necrosis and increased the SGPT activity. If the animals were exposed for 4 hr to 2.0 mg/l CS_2, beginning 0.5 hr after aminotriazole administration the necrotic damage in the liver was larger and the SGPT activity higher than in rats not exposed to CS_2 ($p<0.001$). CS_2 in phenobarbitone-treated starved male rats caused only a very slight increas in the serum transaminase activity in spite of the widespread hydropic degeneration in the liver. These experiments indicate that an increase in serum transaminase activity is the consequence of necrosis and not of hydropic degeneration; aminotriazole is hepatotoxic in rats when microsomal enzymes are induced, and the separate hepatotoxicities of aminotriazole and of carbon disulfide are potentiated by the administration of the other compound.

5961 EFFECTS OF AUREOMYCIN ON BILE ACIDS IN RATS.

(Eng.) Madsen, D. C.; Wostmann, B. S.; Beaver, M.; Chang, L. (Lobund Lab., Univ. Notre Dame, Notre Dame, IN 46556). *J. Lab. Clin. Med.* 91(4):605-611; 1978.

To study the effect of antibiotics on the extent to which bile acids (BAs) are altered by bacteria, rats were treated for 5 days with low levels of Aureomycin (0.85 μM) in the drinking water. This treatment led to a predominance of ω-muricholic ac (ω-MC) over hyodeoxycholic acid (HDC) in the feces at 10 days after withdrawal of the antibiotic. Th reduced the usual HDC/ω-MC ratio from approximatel 2.0 to 0.9 or less. These rats were also found to have liver cholesterol levels modestly elevated over those of controls. In other experiments, the decrease in the HDC/ω-MC ratio was found to persis for at least 90 days after discontinuation of trea ment. Later experiments carried out with Aureomycin and with penicillin revealed the possible existence of a resistance factor to Aureomycin. A significant lowering of the HDC/ω-MC ratio was now found only with antibiotic concentrations 10 to 100 times greater than those used previously. Possible implications of the persistence of antibioti effects, as measured by changes in fecal BAs, include effects on vitamin metabolism, colon cancer, and cholesterol metabolism.

5962 THE EFFECT OF ADDED BRAN TO THE DIET ON THE SATURATION OF BILE IN PEOPLE WITHOUT GALLSTONES.

(Eng.) Watts, J. McK.; Jablonski, P. Toouli, J. (Flinders Medical Center, Bedford Park, South Australia 5042, Australia). *Am. J. Surg.* 135 (3):321-324; 1978.

To determine whether an increase in dietary fiber may create conditions in the biliary tract in which gallstones are less likely to form, bran was added to the diet of 11 volunteers without gallstones, and its effect on bile saturation, bile acid profile in bile, and serum cholesterol and triglycerides was determined. Bile cholesterol saturation was decreased after 2 months of feeding bran to those five women who had supersaturated bile (i.e., 1 saturation index). Bran may be effective in decreasing the lithogenic potential of bile in people without gallstones, and further studies on its place in the prevention of gallstones in susceptible individuals are indicated.

5963 REVERSAL OF CLOFIBRATE-INDUCED CHOLESTEROL OVERSATURATION OF BILE WITH CHENODEOXYCHOLIC ACID.

(Eng.) Bateson, M. C.; Ross, P. E.; Murison, J.; Bouchier, I. A. D. (Ninewells Hosp. and Medical Sch., Dundee DD1 9SY, Scotland). *Br. Med. J.* 1(6121):1171-1173; 1978.

Studies were carried out to assess whether the increase in biliary cholesterol induced by clofibrate is sustained and, if so, whether it can be reversed by chenodeoxycholic acid (CDCA) without any deterioration in the control of hyperlipemia. Giving clofibrate (2 g/day) to seven patients significantly increased the biliary cholesterol conentration ($p<0.05$) while the proportion of bile cids fell. Five patients on established clofirate treatment were given 750 mg of CDCA daily or 1 month. Biliary lipid analysis after the DCA treatment showed a significant fall in the roportion of cholesterol ($p<0.025$) and a rise in hat of bile acids ($p<0.01$). The serum lipid conentrations, which had already been reduced by diet nd clofibrate, showed a further significant reuction after the introduction of CDCA. This study uggests that CDCA may be usefully combined with lofibrate to reverse the tendency towards choleserol saturation of bile and enhance the effect of owering serum lipid concentrations.

964 LIVER DAMAGE IN RABBITS FROM ADMINISTRATION OF A SINGLE DOSE OF GRAM-NEGATIVE NDOTOXIN.

(Eng.) Aballi, A. J.; Karayalcin, G.; ostales, F.; Gubernick, I.; Lanzkowsky, P. (Long sland Jewish-Hillside Medical Center, New Hyde ark, NY 11040). *Pediatr. Res.* 12(5):646-651; 1978.

he effect of a preparatory dose of gram-negative ndotoxin on the liver was investigated, since epatic pathology may explain some disturbances roduced by endotoxin. Sixteen adult male New ealand rabbits had initial liver biopsies, blood hemistries, and coagulation studies and were then ivided into two groups: group I (10 animals) reeived 50 μg/kg endotoxin from *Escherichia coli* 111B4; group II (6 animals) served as controls nd received no endotoxin. In group I, all animals eveloped increased levels of LDH isoenzyme 5 and GOT and decreased serum albumin levels. A rise in the level of SGPT and 5'-nucleotidase occurred in most rabbits. LDH isoenzyme 5 values increased from 3.6 ± 5.83 mU/ml before to 180.4 ± 142.11 mU/ml after endotoxin ($p<0.005$). SGOT levels rose from 28.90 ± 8.87 mU/ml to 241.10 ± 104.76 mU/ml ($p<0.001$). Serum albumin levels decreased from 3.78 ± 0.31 g/dl to 3.21 ± 0.32 g/dl ($p<0.001$). SGPT levels initially showed a level of 41.00 ± 6.97 mU/ml, which rose to 94.40 ± 19.60 mU/ml ($p<0.001$). 5'-Nucleotidase levels rose from 1.48 ± 0.69 mU/ml to 6.01 ± 4.51 mU/ml ($p<0.01$). The animals also had changes in coagulation tests, with a decrease in factors II and V. Factor II was 77.4 ± 11.82% before and 38.70 ± 7.47% after endotoxin ($p<0.001$). Factor V values were 95.00 ± 9.04% before and 50.6 ± 7.5% after endotoxin ($p<0.001$). Changes in fibrinogen and factor VIII levels were not significant. Split products of fibrinogen showed a slight increase. Definite hepatic necrosis consisting of scattered patchy areas of variable size and severity was found in 7 of the 10 animals. In many of these areas of necrosis, a polymorphonuclear leukocyte reaction and a few small thrombi were detectable. The liver biopsies performed before endotoxin administration failed to show any evidence of hepatic involvement. Group II controls showed no indications of abnormal liver function and no evidence of hepatic necrosis. These studies indicate that significant hepatic changes occur after the administration of a single dose of endotoxin given in preparation for the Shwartzman reaction.

5965 EFFECT OF SINUSOIDAL PERFUSION ON GALACTOSE ELIMINATION KINETICS IN PERFUSED RAT LIVER.

(Eng.) Keiding, S.; Chiarantini, E. (Rigshospitalet, Copenhagen, Denmark). *J. Pharmacol. Exp. Ther.* 205(2):465-470; 1978.

A model that assumes the elimination of substrates from the blood by the intact liver to take place at a sinusoidal concentration decreasing along the flow (sinusoidal perfusion model) was evaluated and compared with an earlier approach assuming the elimination to take place at the outflow concentration. Ten livers from female Wistar rats (average weight, 200 g) were perfused in a recirculating system. The rats had been starved for 18 hr prior to perfusion and a constant galactose elimination rate was ensured by constant galactose infusion. Each experiment consisted of three steady-state periods with a blood flow of 15, 9, and 15 ml/min, resp. The sinusoidal perfusion model predicts that reduction of flow at a given elimination rate will reduce hepatic outflow concentration, in contrast to the other model that predicts the outflow concentration to be constant. According to the sinusoidal perfusion model, the logarithmic average concentration ($\hat{c}$) is independent of flow at a given elimination rate; $\hat{c}=(c_i-c_o)/\ln(c_i/c_o)$, where c_i is the inflow concentration and c_o the outflow concentration. There was a significantly lower outflow concentration during the period with low flow than during periods with high flow ($p<0.01$), whereas the logarithmic average concentration was not changed. These observations are consistent with the sinusoidal perfusion model but do not comply with the earlier proposed use of the outflow concentration as an approximation to the sinusoidal concentration.

5966 BIOACTIVATION AND COVALENT BINDING OF HALOTHANE TO LIVER MACROMOLECULES.

(Eng.) Sipes, I. G.; Podolsky, T. L.; Brown, B. R., Jr. (Health Sciences Center, Univ. Arizona, Tucson, AZ 85724). *Environ. Health Perspect.* 21:171-178; 1977.

Studies were carried out in rats to determine if ^{14}C-halothane or its metabolites interact with DNA. Three bioactivation systems were used: *in vitro* microsomal incubations, isolated hepatocytes, and *in vivo* administration. Even though optimal conditions for bioactivation were used, no significant covalent binding of ^{14}C to DNA was observed. Slight ^{14}C activity above background (6 disintegrations/min/0.1 mg DNA) was observed in the microsomal incubations but was considered insignificant because it was not reduced when NADPH was omitted from the incubations. Covalent binding to nuclear lipids and proteins was observed when rats were pretreated with phenobarbital and maintained in a hypoxic environment (14% O_2). Similarly, these conditions markedly increased covalent binding of ^{14}C from ^{14}C-halothane to microsomal proteins and lipids. Isolated rat hepatocytes proved to be a viable system for studying the bioactivation of halothane. In this system it was also possible to demonstrate increased binding under N_2 and/or phenobarbital pretreatment.

5967 HALOTHANE HEPATOTOXICITY AND THE REDUCED DERIVATIVE, 1,1,1-TRIFLUORO-2-CHLOROETHANE.

(Eng.) Brown, B. R., Jr.; Sipes, I. G.; Baker, R. K. (Univ. Arizona Coll. Medicine, Tucson, AZ 85724). *Environ. Health Perspect.* 21:185-188; 1977.

Studies were carried out to investigate the mechanism by which 1,1,1-trifluoro-2-bromo-2-chloroethane (halothane) produces hepatic necrosis. Since the bonding energy of the bromine atom in halothane is known to be relatively weak, the possibility that an enzymatic reductive attack could occur at this site was investigated by synthesizing and studying the hepatotoxic potential of the reduced, debrominated product of halothane, 1,1,1-trifluoro-2-chloroethane. The derivative was unstable and thus was prepared anaerobically and trapped in propylene glycol solvent. Approximately 1 mg of 1,1,1-trifluoro-2-chloroethane in 0.5 ml solvent was injected into the portal vein of male Sprague-Dawley rats under pentobarbital anesthesia (25 mg/kg). The rats were sacrificed 24 hr later. This treatment produced extensive liver necrosis, whereas treatment with the vehicle alone was innocuous. It is postulated that biotransformation of halothane via a reductive pathway could produce this reactive intermediate metabolite, resulting in the hepatotoxicity of this anesthetic.

5968 BILE FLOW AND BILIARY EXCRETION RATE OF SOME ORGANIC ANIONS IN PHENOBARBITAL-PRETREATED RATS.

(Eng.) Fischer, E.; Varga, F.; Gregus, Z.; Gogl, A. (Univ. Medical Sch. Pecs, Szigeti u. 12, H-7643 Pecs, Hungary). *Digestion* 17(3):211-220; 1978.

To gain more information on the correlation between the choleretic effect and the increased biliary excretion in phenobarbital-pretreated rats, bile flow and the biliary excretion of indocyanine green, bromcresol green, eosine, BSP-glutathione conjugate (BSP-GSH), amaranth, and iodoxamic acid were investigated in control and phenobarbital-pretreated rats (75 mg/kg/day, i.p., for 5 days). The bile flow was increased by phenobarbital from an average of 50.6 to 77.7 µl/kg/min. Depending on the dose, the biliary excretion rate of bromcresol green was increased by 48-496% and that of eosine by 30-149%. After phenobarbital pretreatment, the excretion of BSP-GSH was also enchanced by 34-52%, that of amaranth by 37-53%, and that of iodoxamic acid by 40-56%. However, the biliary excretion of indocyanine green remained unchanged. There was no parallelism between the increase in bile flow and biliary excretion of the drugs.

5969 CHOLESTEROL IN ACUTE CHOLESTASIS INDUCED BY TAUROLITHOCHOLIC ACID: A CYTOCHEMICAL STUDY IN TRANSMISSION AND SCANNING ELECTRON MICROSCOPY.

(Eng.) Bonvicini, F.; Gautier, A.; Gardiol, D.; Borel, G. A. (Istituto di Patologia Speciale Medica, Universita degli Studi di Chieti, I-60100 Chieti, Italy). *Lab. Invest.* 38(4):487-495; 1978.

Studies were carried out to verify that ultrastructural changes of taurolithocholic acid-induced cholestasis are similar to those in cholestasis produced by other bile acids or their sodium salts and to correlate chronologically these modification with the variations in bile flow. In addition, attempts were made to determine the cytochemical nature of the substances responsible for the development of these crystalline structures, with particular emphasis on the role of free cholesterol in this process. Rats were each given a single i.v dose of sodium taurolithocholate (100 mg/kg), and an almost total cholestasis appeared after 10 min and lasted for 3 hr after the injection; then choleresis began again, and 24 hr after the injection, normal values of bile flow were restored. Ultrastructural analysis of the liver during the acute cholestasis and the restoration phase showed, beside usual modifications found in most cases of cholestasis, the "characteristic" alterations of sodium taurolithocholate-induced cholestasis. Afte Williamson's reaction procedure, not only were cholesterol-digitonin complexes found in large numbers both in the hepatocytic cytoplasm and in the biliary canaliculi, but also their morphologic appearance revealed several new features: dark sticks and dark lamellae, frequently adsorbed on the outer surface of crystalline clear material, were observed by transmission electron microscopy and plugs, obliterating parts of biliary canaliculi were observed using scanning electron microscopy. These observations seem to indicate that a significant amount of free cholesterol is released into

he hepatocyte cytoplasm and into canalicular lu-
ina within a few minutes after the injection of
odium taurolithocholate, probably originating
rom the hepatocytic membranes, especially from
hose limiting the canalicular lumen. Such a
rastic modification in the chemical constitution
f these membranes should coincide with a marked
odification of their active and passive transport
bility.

970 FATTY LIVER IN HYPERVITAMINOSIS A: SYNTHESIS AND RELEASE OF HEPATIC TRIGLYCER-
DES. (Eng.) Singh, M.; Singh, V. N. (Vallabhbhai
atel Chest Inst., Univ. Delhi, Delhi, 110007 In-
ia). *Am. J. Physiol.* 234(5):E511-E514; 1978.

tudies were carried out in rats to determine the
ffect of excessive vitamin A intake on hepatic
riglyceride secretion into plasma. Feeding large
oses (30,000 IU/100 g body weight/day) of vitamin
to young rats for 2 days produced fatty liver,
aused a stimulation of oxidation ($p<0.001$) and
sterification ($p<0.01$) of [1-^{14}C]palmitate by
iver slices, and increased the activity of hepatic
almitoyl-coenzyme A synthetase ($p<0.01$). Under
imilar conditions, however, release of hepatic
riglycerides into the plasma, as judged from the
ost-Triton triglyceridemia, remained unaffected.
hese findings indicate that excessive vitamin A
ntake produces fatty liver by stimulating the
ynthesis of triglycerides in liver without af-
ecting the rate of secretion of hepatic triglycer-
des. An involvement of altered oxidation of fatty
cids in the liver can also be ruled out, because,
n hypervitaminosis A, this process is increased
ather than decreased as required for fatty liver
roduction.

971 IMPROVED HEPATIC FUNCTION AND SURVIVAL WITH ADENOSINE TRIPHOSPHATE-MAGNESIUM
HLORIDE AFTER HEPATIC ISCHEMIA. (Eng.) Hirasawa,
.; Chaudry, I. H.; Baue, A. E. (Yale Univ. Sch.
edicine, 333 Cedar St., New Haven, CT 06510).
urgery 83(6):655-662; 1978.

he effect of infusion of ATP-MgCl$_2$ after 60 or 90
in of total hepatic ischemia was studied, since
revious work had shown a protective effect of the
dministration of this complex in postischemic
cute renal failure and shock. Following the re-
ease of the hepatic vascular occlusion, ATP-MgCl$_2$,
TP alone, or MgCl$_2$ alone (0.25 ml, 12.5 μmol
ach) was given i.v. to treated animals, and saline
0.25 ml) was given to the controls. Survival was
easured over a period of 5 days. The survival
ate after 60 and 90 min of ischemia was 87.5% and
9.2% in the ATP-MgCl$_2$-treated animals and 43.8% and
3.1% ($p<0.01$ at 60 min and $p<0.02$ at 90 min) in
he control group, resp. When either ATP or MgCl$_2$
lone was given after 60 min of hepatic ischemia,
he survival rate was 20% and 30%, resp. In another
roup of animals, serum enzyme and hepatic ATP lev-
ls were measured 1 hr following the release of 60
in of ischemia. SGOT and SGPT levels were greatly
ncreased following ischemia (1,976 ± 176 and
,141 ± 111 IU/l, resp., after 60 min of ischemia),
d the levels of these enzymes were significantly lowered (729 ± 96 and 520 ± 127 IU/l, resp., $p<0.001$) with ATP-MgCl$_2$ treatment. Hepatic cellular ATP levels and energy charge were significantly decreased during occlusion (1.20 ± 0.11 μmol/g); however, ATP levels were increased (1.87 ± 0.1, $p<0.001$) and the energy charge returned to normal following ATP-MgCl$_2$ treatment. Thus, increased survival and improved hepatic function after ischemia were associated with elevated cellular ATP levels following ATP-MgCl$_2$ administration. While the precise mechanism of action of ATP-MgCl$_2$ remains unknown, these observations may have important implications for future use in organ preservation, management of postischemic acute hepatic failure, and multiple systems failure.

5972 POLYVINYLCHLORIDE (PVC) PARTICLES IMPLANTATION IN MOUSE LIVER. A TECHNIQUE FOR EXPERIMENTAL STUDY OF SCHISTOSOME EGGS-INDUCED LIVER PATHOLOGY. (Eng.) Joky, A.; Cornu, M.; Louis, D.; Grimaud, J. A. (Centre de Microscopie Electronique et de Pathologie Ultrastructurale, Institut Pasteur, 77, rue Pasteur, F-69265 Lyon, France). *Experientia* 34(4):547-549; 1978.

To study the cellular changes of the portal tract produced by foreign body granuloma and the consequent hepatic vascular bed modifications, a model system was developed using intrahepatic implantation of polyvinylchloride (PVC) particles in Swiss albino mice. Five control mice, 10 mice injected into the cecal vein with PVC particles (about 20,000 particles each 110 ± 30 μm in diameter and 1.4 in density), and 5 mice infested with cercariae of *Schistosoma mansoni* were examined 8 days after injection or 8 weeks after cercarial exposure by light and electron microscopy and by the preparation of plastic casts of the portal system. The plastic casts revealed a marked decrease in the number of small injected veins and a sudden reduction in the diameter of the medium and small portal veins in the PVC-injected livers that was also apparent in the schistosome-infested livers as compared with the normal controls. Light microscopy revealed a granulomatous reaction around the PVC particles, and electron microscopy of periparticular granulomatous areas showed numerous macrophages and giant cells in contact with the PVC particles, and a lymphoplasmocytic, granulocytic, and fibroblastic infiltration was also evident. This technique produces changes in the intrahepatic portal system similar to those seen in human and murine schistosomiasis and appears useful to test the consequences of permanent portal foreign body modification on fibroblastic stimulation, collagen deposition, and fibrous tissue remodeling.

5973 INCREASED BILIRUBIN EXCRETION INTO BILE AFTER CHRONICAL [sic] CLOFIBRATE (C) ADMINISTRATION IN THE RAT [Abstract]. (Eng.) Kutz, K.; Schulte, A.; Fevery, J. (Medizinische Poliklinik, Univ. Bonn, Bonn, W. Germany). *Digestion* 16(4): 331; 1977.

5974 MECHANISM FOR TRICHLOROETHYLENE HEPATOTOXICITY [Abstract]. (Eng.) Allemand, H.; Pessayre, D.; Descatoire, V.; Degott, C.; Feldmann, G.; Benhamou, J. P. (Unite de Recherches de Physiopathologie Hepatique [INSERM], Hopital Beaujon, Clichy, France). *Digestion* 16(4):331-332; 1977.

5975 INCREASED UPTAKE OF FATTY ACID BY THE ISOLATED RAT LIVER AFTER RAISING FABP CONCENTRATION BY CLOFIBRATE [Abstract]. (Eng.) Renaud, G.; Foliot, A.; Infante, R. (INSERM U 9, Hopital Saint Antoine, Paris, France). *Digestion* 16(4): 330; 1977.

5976 EFFECT OF SINUSOIDAL PERFUSION ON HEPATIC GALACTOSE ELIMINATION KINETICS IN PERFUSED RAT LIVER [Abstract]. (Eng.) Chiarantini, E.; Keiding, S. (Dept. Medical Pathology, Univ. Florence, Florence, Italy). *Digestion* 16(4):340-341; 1977.

5977 TRANSPORT OF DRUGS IN ISOLATED HEPATOCYTES. THE INFLUENCE OF BILE SALTS [Abstract]. (Eng.) Vonk, R. J.; Jekel, P. A.; Meijer, D. K. F.; Hardonk, M. J. (Dept. Pharmacology, State Univ. Groningen, Groningen, Netherlands). *Digestion* 16(4):340; 1977.

5978 EFFECT OF BACTERIAL ENDOTOXINS (LPS) ON Na^+,K^+-ATPase ACTIVITY OF CANALICULAR-ENRICHED LIVER PLASMA MEMBRANES [Abstract]. (Eng.) Utili, R.; Abernathy, C. O.; Zimmerman, H. J. (Clinica Malattie Infettive, Universita di Napoli, Napoli, Italy). *Digestion* 16(4):338; 1977.

5979 LIVER CELL HETEROGENEITY AND BILE SECRETION IN THE RAT [Abstract]. (Eng.) Balabaud, C.; Gumucio, J. J.; Miller, D. L.; Appelman, H. D. (Laboratoire de Pharmacologie, Universite de Bordeaux II, Carriere-Nord, Bordeaux, France). *Digestion* 16(4):338; 1977.

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5982 THE EFFECT OF INTRAVENOUS HYPERTONIC ALBUMIN ON BILE FLOW IN THE RABBIT [Abstract]. (Eng.) Nicholls, R. J. (Chirurgische Universitatsklinik, Heidelberg, W. Germany). *Digestion* 16(4):342; 1977.

5983 DETERMINATION OF LIVER CELL MEMBRANE RESISTANCE BY THREE-DIMENSIONAL CABLE ANALYSIS [Abstract]. (Eng.) Graf, J. (Dept. General, Experimental Pathology, Univ. Vienna, Vienna, Austria). *Digestion* 16(4):343; 1977.

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5985 PHALLOIDIN INCREASES MICROFILAMENTS AND CAUSES CHOLESTASIS IN THE RAT [Abstract]. (Eng.) Dubin, M.; Maurice, M.; Feldmann, G.; Erlinger, S. (Hopital Beaujon, Clichy, France). *Digestion* 16(4):336-337; 1977.

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5989 HYPERBILIRUBINEMIA AND SLOW ACETYLATION IN THE HORSE: A PARALLEL TO GILBERT'S SYNDROME (GS) [Abstract]. (Eng.) Kupfer, A.; Gronwall, R.; Preisig, R. (Dept. Clinical Pharmacology, Univ. Berne, Berne, Switzerland). *Digesti* 16(4):353; 1977.

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5991 ISOLATED RAT HEPATOCYTES: A USEFUL TOO TO STUDY HEPATIC CHOLESTEROL SYNTHESIS ITS REGULATION [Abstract]. (Eng.) Crovetti, F.; Tarugi, P.; Battistini, N.; Calandra, S. (Istitut di Patologia Generale, Modena, Italy). *Digestion* 16(4):354; 1977.

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6001 THE ULTRASONICALLY GUIDED PUNCTURE OF THE GALLBLADDER IN ANIMALS: A NEW METHODOLOGICAL PROCEDURE FOR A SIMPLE AND NON-SURGICAL COLLECTION OF GALLBLADDER BILE. (Eng.) Klapdor, R.; Scherer, K.; Sepehr, H.; Kloppel, G. (I. Medical Dept., Univ. Hamburg, Martinistrasse 52, D-2000 Hamburg 20, W. Germany). *Endoscopy* 9(3): 166-169; 1977.

6002 ENUMERATION OF ALPHAFETOPROTEIN SECRETING CELLS USING A REVERSE HEMOLYTIC PLAQUE ASSAY DURING THE GROWTH OF MORRIS HEPATOMA 7777 IN CULTURE. (Eng.) de Nechaud, B.; Fromont, S.; Berges, J. (Institut de Recherches Scientifiques sur le Cancer, B.P. 8, 94800 Villejuif, France). *Biochem. Biophys. Res. Commun.* 79(3):789-795; 1977.

6003 THE HEPATIC VASCULATURE AND ITS RESPONSE TO HEPATIC INJURY: A WORKING HYPOTHESIS. (Eng.) Zimmon, D. S. (Veterans Admin. Hosp., 408 First Ave., New York, NY 10010). *Yale J. Biol. Med.* 50(5):497-506; 1977.

6004 HIGH AFFINITY ESTROGEN BINDING BY RABBIT LIVER. (Eng.) Danzo, B. J.; Krishnamurthy, V.; Eller, B. C. (Vanderbilt Univ. Sch. Medicine, Nashville, TN 37232). *Biochim. Biophys. Acta* 500(2):310-321; 1977.

6005 ANDROGEN INHIBITION OF BASAL AND ESTROGEN-STIMULATED PROLACTIN BINDING IN RAT LIVER. (Eng.) Kelly, P. A.; LeBlanc, G.; Ferland, L.; Labrie, F.; De Lean, A. (Le Centre Hospitalier de l'Universite Laval, Quebec G1V 4G2, Canada). *Mol. Cell. Endocrinol.* 9(2):195-204; 1977.

See also, 5847, 5851, 5852, 5853, 5854, 5884, 5947, 6015, 6046, 6068, 6069, 6352, 6368, 6398, 6404, 6411, 6424, 6469, 6475, 6476, 6526, 6541.

Intestine

6006 DETERMINATION OF VIABILITY OF ISCHEMIC INTESTINE BY DOPPLER ULTRASOUND. (Eng.)

Cooperman, M.; Pace, W. G.; Martin, E. W., Jr.; Pflug, B.; Keith, L. M., Jr.; Evans, W. E.; *et al.* (Dept. Surgery, Ohio State Univ., Columbus, OH 43210). *Surgery* 83(6):705-710; 1978.

Experiments were carried out to determine whether Doppler ultrasound can be used to determine the viability of ischemic small intestine and to select the optimum point for resection of nonviable bowel. Twenty ischemic segments of small intestine were produced in dogs by ligating the vascular supply. The Doppler ultrasound probe then was used to determine the last point of arterial flow within the bowel wall. The dogs were re-explored after 24 hr. Histological examination of full-thickness biopsies showed the intestine to be normal in all 20 segments at the last audible Doppler signal, and in 19 of the 20 segments at 1 cm distal to the last signal. Progressive degrees of necrosis were observed at 2 and 3 cm distal to the last signal. Twenty-five segments of ischemic intestine were resected in baboons. All resections performed at the last Doppler signal or 1 cm distal to it were normal 1 month later. Of 15 resections performed at 2, 3, and 4 cm distal to the last signal, 10 showed evidence of stricture or anastomotic disruption. Doppler ultrasound is a reliable method for determining the viability of ischemic intestine and for selecting the optimum point for resection of nonviable bowel.

6007 REGULATION OF CHOLESTEROL SYNTHESIS IN CULTURED CANINE INTESTINAL MUCOSA.

(Eng.) Gebhard, R.•L.; Cooper, A. D. (Minneapolis Veterans Admin. Hosp., Minneapolis, MN 55417). *J. Biol. Chem.* 253(8):2790-2796; 1978.

The validity of the intestinal organ culture technique for investigating the regulation of intestinal cholesterol synthesis was examined and the effects of free cholesterol, oxygenated cholesterol derivatives, bile salts, and lipoproteins on this process were studied in canine ileal mucosa maintained in organ culture for 6 hr. Viability was monitored by light and electron microscopy, measurement of cellular enzymes, and the ability to actively transport a glucose analogue. The activity of 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase, the rate-limiting enzyme of cholesterol synthesis, increased fourfold during the 6-hr culture. A parallel increase occurred in the rate of acetate incorporation into digitonin-precipitable sterols during this period. This increase was prevented by the addition of 0.2 mM cycloheximide to the culture. Pure colesterol, 7-ketocholesterol, and 25-hydroxycholesterol, when present at 0.2 mM during the last 4 hr of culture, also caused significant ($p<0.01$) suppression of the rise in HMG-CoA reductase activity (final HMG-CoA reductase with the three sterols was 77 ± 4%, 68 ± 5%, and 58 ± 3% of control postculture value, resp.). Bile salts at low, nontoxic concentratio also inhibited the increase of enzyme activity (2 taurocholate=63 ± 3% of control, 0.5 mM taurochenodeoxycholate=76 ± 6% of control). In contrast, dog lipoproteins separated by ultracentrifugation failed to significantly affect intestinal cholesterol synthesis in these short-term organ cultures. The intestinal organ culture technique is valid for measuring intestinal cholesterol synthesis. The suppression of cholesterol synthesis produced by the addition of cholesterol to the culture medium convincingly demonstrates that aut regulation can occur.

6008 CHYMOTRYPSINLIKE ACTIVITY OF SOME INTESTINAL BACTERIA. (Eng.)

Gyr, K.; Felse feld, O.; Imondi, A. R. (Kantonsspital, CH-4004 Basel, Switzerland). *Am. J. Dig. Dis.* 23(5):413-416; 1978.

Since some tests of exocrine pancreatic function are based on the estimation of intestinal chymotryptic activity by using specific substrates suc as *N*-benzoyl-L-tyrosyl-PABA (BT-P), the action of a number of bacteria isolated from human or monke intestines on BT-P was investigated. The monkeys studied had an intestinal flora closely resemblin that of man. Except for *Bacteroides*, *Proteus vulgaris* No. 73, *Proteus morgani* No. 202, and *Pseudomonas aeruginosa* No. 76, significant splitting of BT-P did not take place when 20 common enteric microorganisms were tested. It is concluded that with the possible exception of bacterial overgrow of the small bowel, microbial chymotryptic activi is not important in influencing the outcome of th BT-P test.

6009 POSTNATAL DEVELOPMENT OF CIRCADIAN RHYT IN DISACCHARIDASE ACTIVITIES IN RAT SMA INTESTINE. (Eng.)

Saito, M.; Sudo, M.; Matzuda, (Sch. Medicine, Ehime Univ., Shigenobu, Ehime 791-02, Japan). *Am. J. Physiol.* 234(5):E500-E503; 19

To examine the relationship between the disaccharidase activity rhythm and food intake during development, the circadian rhythms in the activitie of maltase and lactase of the small intestine wer examined at various stages of postnatal developme in rats. When the rats were fed *ad libitum*, no circadian change in the enzyme activities was fou during the suckling or the weanling period. However, approximately 1 week after the time of weaning, the enzymes showed the same circadian changes as in adult rats, with higher activities night ($p<0.001$, difference between maltase activi at 0000 and 1200 hr). After weaning, when the ra were fed only during the daytime, the phase of th enzyme rhythm shifted about half a day, and the highest activity was observed around feeding time However, during the suckling period, no circadian rhythm in the enzyme activities was found, even when the rats were allowed to feed only during a

estricted time of the day. The authors postulate
hat the postnatal development of the enzyme activ-
ity rhythm may depend on maturation of a mechanism
hat is based on the rats' anticipating daily feed-
ing; if this is so, this anticipatory mechanism has
ot yet developed during the suckling period.

010 SUBCELLULAR LOCALIZATION OF ENTEROKINASE IN HUMAN DUODENAL MUCOSA. (Eng.) Lobley,
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o determine whether the brush border is the only
ubcellular locus of enterokinase activity, the
ocalization of enterokinase was studied in human
uodenal mucosa, using a subcellular fractionation
echnique whereby the principal organelles of the
nterocyte could be separated with minimal damage,
nd the overall subcellular distribution of the
nzyme determined. Specimens of mucosa were ob-
ained at duodenotomy. Superficial mucosal scrap-
ngs were homogenized in isotonic sucrose solution
nd fractionated by differential centrifugation.
he distribution of organelles among the subcellular
ractions was monitored by assay of suitable marker
nzymes. Enterokinase was recovered predominantly
n the nuclear and brush border fraction, and 80%
f the total activity was found to be particulate;
pproximately 20% of the enzyme was present in the
oluble fraction, compared with 1% of the brush
order markers sucrase and alkaline phosphatase.
he brush border-containing fraction was subfraction-
ted by treatment with hypertonic Tris followed by
ifferential and density gradient centrifugation.
nterokinase was distributed among the subfractions
n parallel with brush border markers and was con-
entrated in a subfraction that was highly en-
iched in microvillous membranes. It is concluded
hat enterokinase is localized primarily to the
icrovillous membrane of the epithelial cell brush
order in man, but that, in addition, a proportion
f the enzyme may be present in a soluble or easily
eleased form in the duodenal mucosa.

11 GLYCOPROTEIN CONTAINING VESICLES IN THE SURFACE EPITHELIAL CELLS OF THE ASCENDING
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e hypothesis that the glycoproteins of the cell
at are completed in the Golgi apparatus and mi-
ate to the cell surface in vesicles has been
pported by the results of radioautographic stud-
s in the ameba and in the mouse ascending colon,
d this theory was further investigated in a
rphological and cytochemical study of the surface
ithelial cells of the rat ascending colon. Fila-
ntous material, resembling the cell coat, was
en to be contained in saccules toward the mature
ce of the Golgi apparatus and in vesicles close
the apparatus and near the terminal web. The
sicles were limited by a unit membrane composed
asymmetric osmiophilic leaflets and similar to
e plasma membrane. When stained by the periodic acid-chromic acid-silver methenamine technique, silver was precipitated on the cell components containing the filamentous material, indicating the presence of glycoproteins. Narrow invaginations from the cell surface that may correspond to vesicles undergoing exocytosis were also positive for glycoproteins. The distribution of the filamentous material that was glycoprotein-positive parallels the pathway followed by material that had been found to be labeled with a tritiated glycoprotein precursor (^{3}H-fucose) in the epithelial cells of the ascending colon of the mouse. It is suggested that the system of vesicles in the rat colon cells is acting in a manner similar to the vesicles in the mouse cells to transport cell coat glycoproteins from the Golgi apparatus to the cell surface.

6012 STUDIES ON THE BRUSH BORDER MEMBRANE OF MOUSE DUODENUM: LIPIDS. (Eng.) Billington, T.; Nayudu, P. R. V. (Dept. Zoology, Monash Univ., Clayton, Victoria 3168, Australia). *Aust. J. Exp. Biol. Med. Sci.* 56(Part 1):25-29; 1978.

The types and quantities of lipids extracted from purified mouse duodenal brush border membranes were studied. Lipid:protein ratios in different membrane preparations varied from 0.58 to 0.68. Both the chloroform and non-chloroform phases were quantitatively analyzed for lipids. Chloroform extracts were composed of cholesterol, triglycerides, and phospholipids. The major neutral lipid was cholesterol. Rechromatography of the phospholipid spot showed sphingomyelin (7.9%), phosphatides of ethanolamine (61.7%), inositol (14.2%), and serine (16.2%). The average molar ratio of cholesterol to phospholipid was 1:39. Lipids in the non-chloroform phase were all glycosylated, being cerebrosides (69.3%), cerebroside sulfates (28.8%), and gangliosides (1.9%). Overall membrane lipid composition was neutral lipid 24%, phospholipid 33%, and glycolipid 43%. There are both quantitative and qualitative differences in the lipid composition of the brush border membranes of mouse and rat.

6013 LIPID SYNTHESIS IN ISOLATED INTESTINAL CELLS. (Eng.) Shakir, K. M. M.; Sundaram, S. G.; Margolis, S. (Johns Hopkins Sch. Medicine, Baltimore, MD 21205). *J. Lipid Res.* 19(4): 433-442; 1978.

Since the small intestine contributes significantly to serum cholesterol and very low density lipoprotein levels, acute regulation of lipid synthesis was investigated in isolated rat intestinal cells incubated in Krebs-Ringer bicarbonate buffer with 5 mM glucose and ^{14}C-acetate or $^{3}H_2O$ to test the suitability of this preparation for studying this phenomenon. Incorporation of ^{14}C-acetate into cellular lipids was six- to eightfold greater in crypt than in villus cells. In both cell types, the distribution of ^{14}C among the various lipid classes was as follows: 52.5% in triglycerides, diglycerides, and monoglycerides; 22.3% in cholesterol; 8.3% in cholesteryl esters; 1.9% in fatty acids; and 15.0% in phospholipids. In contrast, the lipids in the medium contained significantly higher ($p<0.001$ or $p<0.005$) amounts of tri-, di-, and monoglycerides (61.1%) and lower ($p<0.05$) amounts of cholesteryl esters (2.3%) and phospholipids (11.9%). After saponification, two-thirds of the recovered ^3H_2O was in fatty acids and one-third in cholesterol. Ethanol treatment (10 mM) tripled ^3H_2O incorporation into cellular lipids but had no effect on ^{14}C-acetate incorporation. Epinephrine and norepinephrine (10 μM), glucagon (10 μM), dibutyryl cyclic AMP (1 mM), dexamethasone (1 mM and 1 μM), and cholera toxin (1 μg/ml) did not affect ^{14}C-acetate incorporation. It is concluded that ethanol stimulates intestinal lipid synthesis; however, in sharp contrast to their inhibition of lipid synthesis in hepatocytes and adipocytes, catecholamines, glucagon, and dibutyryl cyclic AMP do not inhibit lipid synthesis in intestinal cells.

6014 RAT INTESTINE SECRETES DISCOID HIGH DENSITY LIPOPROTEIN. (Eng.) Green, P. H. R.; Tall, A. R.; Glickman, R. M. (Beth Israel Hosp., Boston, MA 02215). *J. Clin. Invest.* 61(2):528-534; 1978.

To determine whether mesenteric lymph contains nascent high density lipoprotein (HDL), HDL was isolated from pooled rat serum and mesenteric lymph of lymph fistula rats. In most experiments, 5,5'-dithionitrobenzoic acid, an inhibitor of the enzyme lecithin:cholesterol acyltransferase, was added during the collection of lymph to prevent modification of the lipid composition of newly secreted lipoproteins. Negative staining electron microscopy of lymph high density lipoprotein revealed discoidal particles (190 ± 3 x 55 ± 1 A) which tended to form rouleaux; smaller spherical particles were also present. Serum high density lipoprotein contained only spherical particles (diameter 93 ± 4 A). Lipid analysis showed that lymph HDL was enriched in phospholipid and deficient in cholesterol esters when compared with serum HDL. The phospholipid to cholesterol esters ratio was greatest in basal lymph HDL when compared with fatty lymph and serum HDL. From analysis of the lipid compositional data and direct particle measurement by electron microscopy, it was calculated that approximately 50% of basal lymph HDL and 30% of fatty lymph HDL was discoid. Basal lymph HDL was enriched in apoprotein A-I and deficient in the arginine-rich peptide, and the apoprotein composition of fatty lymph HDL more closely resembled that of serum. These observations demonstrate that intestinal lymph contains two types of HDL particles, a discoid nascent particle deficient in cholesterol ester and rich in apoprotein AI, and spherical HDL derived from plasma. A significant amount of lymph HDL appears to be secreted by the intestine.

6015 CONTRIBUTIONS OF BILE AND PANCREATIC JUICE TO CELL PROLIFERATION IN ILEAL MUCOSA. (Eng.) Williamson, R. C. N.; Bauer, F. L. R.; Ross, J. S.; Malt, R. A. (Shriners Burns Inst., Boston, MA). *Surgery* 83(5):570-576; 1978.

To determine the relative contributions of bile and pancreatic juice to adaptive intestinal hyperplasia cell proliferation in rat ileal mucosa was studied after supplying bile alone or the combined pancreaticobiliary effluent directly to the mid-small bowel. Bile was routed through the choledochus cannulated above the pancreas. Pancreaticobiliary secretions were diverted through a transposed duodena segment containing the papilla. Transection of the jejunum with reanastomosis was performed as a control operation. Diversion of bile into the midbowel with and without pancreatic juice caused similar increases in ileal RNA (16-50%) and DNA (22-41%) contents at both 48 hr and 1 week after operation. Specific activity of DNA after injection of tritiated thymidine was greatest after diversion of the combined effluent. After 1 month, nucleic acid contents in the upper ileum after pancreaticobiliary diversion were 37% to 59% higher than after transection or biliary diversion ($p<0.005$). Likewise, after biliary diversion villous height and crypt depth were increased only at 1 week, but after diversion of both secretions increases were found at 1 week and 1 month. High luminal concentrations of bile cause transient cell proliferation in ileal mucosa, but the additional presence of pancreatic juice prolongs this adaptive response

6016 LACK OF EFFECT OF BILE IN PATHOGENESIS OF SECRETION IN MECHANICAL SMALL BOWEL OBSTRUCTION. (Eng.) Mirkovitch, V.; Blanc, D.; Macarone-Palmieri, R.; Mosimann, F.; Robinson, J. W. L.; Menge, H. (Departement de Chirurgie Experimentale, CHUV, CH-1011 Lausanne, Switzerland). *Digestion* 17(3):204-210; 1978.

The role of stagnated bile as a possible agent provoking the intestinal secretion observed above a mechanical obstruction in dogs was explored by ligating the common bile duct and diverting the bil by means of an anastomosis between the gallbladder and the ileum distal to the obstruction. Seven days after the creation of an obstruction with bil diversion, the functional and morphological change in the obstructed loop were almost identical to those occurring in animals with obstructions without bile diversion. The secretory response above the obstruction continued unabated, with levels of cyclic AMP in the secreting mucosae lower than in control tissues. These results suggest that the secretion in the obstructed intestine is not influenced by the presence of bile, and that this secretion may not be secondary to an increase in mucosal cyclic AMP levels.

6017 PREVENTION AND REVERSAL OF CHOLERA ENTE TOXIN EFFECTS IN RABBIT JEJUNUM BY NICOTINIC ACID. (Eng.) Turjman, N.; Gotterer, G. S. Hendrix, T. R. (Johns Hopkins Univ. Sch. Medicine, Baltimore, MD 21205). *J. Clin. Invest.* 61(5):1155 1160; 1978.

Studies were carried out to determine whether intestinal secretion and cyclic AMP (cAMP) elevation induced by cholera toxin could be prevented, or once initiated, reversed by nicotinic acid, an gent known to lower tissue levels of cAMP. In abbits, four jejunal loops were constructed as lternating control (3-ml isotonic electrolyte olution) and cholera toxin (same solution containing 0 μg purified cholera toxin) loops. Net intestinal ecretion was determined by measuring fluid accum-lation, after which intestinal biopsies were taken or cAMP assay. The animals were pretreated either ith 50 mg/kg nicotinic acid in saline 3 hr and 1 r before the introduction of cholera toxin, or ntraluminally with 200 mg/kg nicotinic acid in inger's lactate solution 15 min before the instil-ation of cholera toxin. Under these conditions, icotinic acid blocked the cholera toxin-induced ecretion and the rise in cAMP measured 3 hr after he loops were exposed to cholera toxin. The ef-ect of the nicotinic acid administered within he lumen on net intestinal secretion was studied. aximal inhibition of net intestinal secretion was chieved with an intraluminally administered dose f nicotinic acid of 100 mg/kg. This dose was hosen for testing the ability of nicotinic acid o reverse the effects of cholera toxin. When icotinic acid was instilled into a fifth loop onstructed distally to the four experimental loops hr after exposure of these loops to cholera oxin, both intestinal secretion and elevation of AMP were reversed. These results suggest that icotinic acid can prevent and reverse the secre-ory effects of cholera toxin and may have a role n the therapy of cholera and other cAMP-associated iarrheal diseases.

018 INFLUENCE OF DIETS HIGH AND LOW IN ANIMAL FAT ON BOWEL HABIT, GASTROINTESTINAL TRAN-IT TIME, FECAL MICROFLORA, BILE ACID, AND FAT EX-RETION.

(Eng.) Cummings, J. H.; Wiggins, H. S.; enkins, D. J. A.; Houston, H.; Jivraj, T.; Drasar, . S.; *et al.* (Medical Res. Council Dunn Nutrition nit, Cambridge, England). *J. Clin. Invest.* 61(4): 53-963; 1978.

nder metabolic conditions, the effect of diets con-aining 62 or 152 g/day of fat mainly of animal origin n bowel habit, gastrointestinal transit time, fecal icroflora, bile acids, and fat excretion were inves-igated in six healthy young men over 4-week periods, n an effort to determine whether dietary fat could e responsible for slow transit and reduced fecal ulk, which has been associated with large bowel can-er. No change attributable to the diet was observed n the subjects' bowel habit, fecal weight, mean ransit time through the gut, or in the excretion f dry matter. Total fecal bile acid excretion as significantly higher on the high fat diet (320 120 mg/day) than on the low fat diet (139.7 ± 63 g/day, *t* test=7.78, $p<0.001$), as was the total ecal fatty acid excretion (3.1 ± 0.71 and 1.14 0.35 g/day, resp., *t* test=11.4, $p<0.001$). The ecal microflora, including the nuclear dehy-rogenating clostridia, were unaltered by the ietary changes as was fecal β-glucuronidase activi-. Dietary changes that increase animal fat intake learly influence fecal bile acid excretion in a ay that would favor the development of large bowel ncer if current theories prove to be true. Di-ary fat, however, has no effect on overall colonic function so other components of the diet must be responsible for the observed associations of bowel cancer with slow transit and reduced fecal bulk.

6019 THE EFFECT OF FAT ON SECRETIN RELEASE.

(Eng.) Miller, T. A.; Konturek, S. J.; Llanos, O. L.; Rayford, P. L.; Thompson, J. C. (Univ. Texas Medical Branch, Galveston, TX 77550). *Ann. Surg.* 187(3):303-308; 1978.

To investigate the effect of fat on secretin release, the effect of graded doses of i.v. infused secretin and intestinally perfused sodium oleate and HCl on pancreatic exocrine secretion and plasma secretin was determined in cats and dogs prepared with pancreatic fistulas. The pancreatic dose-response curves for bicarbonate following duodenal perfusion of oleate and HCl in cats were almost identical and paralleled the response to exogenous secretin. Significant elevation of plasma secretin from a basal of 189 ± 41 to 377 ± 80 pg/ml was measured with the administration of 0.5 U/kg/hr of exogenous secretin. The intraduodenal infusion of 0.5 mEq/hr of HCl resulted in a significant elevation of plasma secretin levels from a basal of 257 ± 26 to 400 ± 70 pg/ml. Although the bicarbonate response to oleate in dogs was less pronounced than the response to HCl or secretin (about 50% of that in response to HCl), the bicarbonate output was observed to increase relative to protein output with increasing doses of the intestinally perfused fat. These observations suggest that secretin or a substance with secretin-like activity may be released from the intestine on contact with fat. The inability to detect changes in secretin immunoreactivity in both cats and dogs with increasing doses of oleate suggests that if secretin is released, it is in amounts undetectable by the radioimmunoassay or that some other unknown substance with secretin-like activity may be released.

6020 EFFECT OF LACTULOSE ON AMMONIA PRODUCTION IN A FECAL INCUBATION SYSTEM.

(Eng.) Vince, A.; Killingley, M.; Wrong, O. M. (Univ. Coll. Hosp. Medical Sch., London WC1E 6JJ, England). *Gastroenterology* 74(3):544-549; 1978.

The influence of lactulose on colonic ammonia metabolism was investigated using an *in vitro* fecal incubation system. Lactulose and other fermentable substrates (glucose, mannitol, and sorbitol), pH, and organic acid were varied independently so that their different effects could be determined. Fermentable substrate caused a decrease in ammonia concentration during the period of fermentation ($p<0.01$ with 0.03 M lactulose). Acidification to pH 5.0 or less, with hydrochloric acid or a lactic-acetic acid mixture, significantly reduced ammonia generation ($p<0.001$), but unlike fermentable substrates, did not lower the existing ammonia concentration. The lactic-acetic acid mixture did not reduce ammonia generation significantly below that found with acidification by hydrochloric acid. The effect of lactulose in reducing ammonia concentration is attributed to its role as a bacterial substrate in either increasing bacterial assimilation of ammonia or reducing deamination of nitrogenous compounds. The effect of low pH in reducing generation of ammonia appears to be part of a general reduction in bacterial metabolism.

6021 MECHANISM OF CECAL SECRETION IN THE GERM FREE RAT [Abstract]. (Eng.) Donowitz, M.; Binder, H. J. (Yale Univ. Sch. Medicine, New Haven, CT). *Gastroenterology* 72(5, Part 2):1050; 1977.

6022 THE INTESTINAL PHASE OF POSTPRANDIAL GASTRIC FUNCTION IN MAN: OPPOSITE ROLES OF JEJUNUM AND ILEUM [Abstract]. (Eng.) Clain, J. E.; Go, V. L. W.; Malagelada, J. R. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 72(5, Part 2):1039; 1977.

6023 JEJUNAL FLOW, TRANSIT TIME AND MIXING FOLLOWING A SOLID-LIQUID MEAL [Abstract]. (Eng.) Matseshe, J. W.; Malagelada, J. R.; Phillips, S. F. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 72(5, Part 2):1099; 1977.

6024 INFLUENCE OF DIET COMPONENTS ON SMALL BOWEL ADAPTATION AFTER RESECTION [Abstract]. (Eng.) Buts, J. P.; Morin, C. L.; Bourassa, D.; Ling, V. (Hopital Ste-Justine, Montreal, Canada). *Gastroenterology* 72(5, Part 2): 1035; 1977.

6025 RELEASE OF ACETYLCHOLINE FROM THE MYENTERIC PLEXUS OF SMALL INTESTINE [Abstract]. (Eng.) Nemeth, P. R.; Yau, W. M. (Dept. Physiology, Southern Illinois Univ., Carbondale, IL). *Gastroenterology* 72(5, Part 2):1107; 1977.

6026 DEMONSTRATION OF FATIGUE OF SECRETIN RESPONSE TO ACID PERFUSION OF THE SMALL INTESTINE [Abstract]. (Eng.) Chung, R. S. K.; Johnson, G. M. (Veterans Admin. Hosp., Iowa City, IA). *Gastroenterology* 72(5, Part 2):1038; 1977.

6027 THE MECHANISM BY WHICH ACID STIMULATES SECRETIN RELEASE: A UNIFYING MODEL [Abstract]. (Eng.) Moore, E. W. (Medical Coll. Virginia, Richmond, VA). *Gastroenterology* 72(5, Part 2):1104; 1977.

6028 CANINE DUODENAL MUCOSA HAS AN INDEPENDENT MECHANISM FOR BICARBONATE NEUTRALIZATION OF ACID. (Eng.) Harmon, J. W.; Woods, M. (Walter Reed Army Inst. Res., Washington, DC). *Surg. Forum* 28:421-423; 1977.

6029 THE ENZYMIC ACTIVITY OF TRANSIENT SODIUM DODECYL SULPHATE-PROTEIN COMPLEXES OF RAT INTESTINAL MALTASE-GLUCOAMYLASE FORMED DURING DISSOCIATION. (Eng.) Flanagan, P. R.; Forstner, G. G. (Hosp. Sick Children, Toronto, Ontario M5G 1X8, Canada). *Biochem. Soc. Trans.* 5(5):1542-1543; 1977.

6030 THE ROLE OF PHOSPHATE IN THE ACTION OF VITAMIN D ON THE INTESTINE. (Eng.) Birge, S. J.; Miller, R. (Washington Univ. Sch. Medicine, St. Louis, MO). *J. Clin. Invest.* 60 (5):980-988; 1977.

6031 ANESTHETIC PROPERTIES OF DUODENAL HORMONES (Rus.) Rafes, Iu. E.; Sheleketina, I. I.; Averyanova, L. P. (Dnepropetrovsk Scientific Res. Inst. Gastroenterology, Dnepropetrovsk, USSR). *Anesteziol. Reanimatol.* (2):69-70; 1977.

6032 IMMUNOMORPHOLOGICAL DETECTION OF MELATONIN SYNTHESIS IN ENTEROCHROMAFFIN CELLS. (Rus.) Raikhlin, N. T.; Kvetnoy, I. M.; Kadagidze, Z. G.; Sokolov, A. V. (Oncological Center, USSR Acad. Medical Sciences, Moscow, USSR). *Arkh. Patol.* 39(7):55-58; 1977.

6033 RADIOIMMUNOASSAY FOR HUMAN SECRETIN DETERMINATION. (Ger.) Girard, J.; Baumann J. B.; van Hees, G.; Kayasseh, L.; Gyr, N.; Stalder G. A. (Kinderspital, Romergasse 8, CH-4005 Basel, Switzerland). *Schweiz. Med. Wochenschr.* 107(15): 542-544; 1977.

6034 EFFECTS OF LESIONS OF CERTAIN ZONES OF TH BRAIN ON CELL MITOSIS IN THE SMALL INTESTINAL EPITHELIUM OF THE RAT. (Fre.) Bindoni, M.; Bava, A.; Stanzani, S.; Campione, C.; Nicotra, I. (Istituto di Fisiologia umana dell'Universita di Catania, Viale Andrea-Doria, 6, 95125 Catania, Italy). *C. R. Acad. Sci. [D] (Paris)* 284(16):1565-1568; 1977.

6035 EFFECTIVENESS OF ENTEROSTOMY IN MECHANICA INTESTINAL OBSTRUCTION. (Rus.) Makhache M. O.; Arbuliev, M. G. (Dept. Clinical Surgery and Topographical Anatomy, Dagestan Medical Inst., Makhachkala, USSR). *Khirurgiia (Mosk.)* (11):61-64; 1977.

6036 ENZYMOMORPHOLOGY IN SUCKLING RABBITS WITH CHOLERAGEN TOXICITY. (Rus.) Isupov, I. V.; Sageeva, O. F. ("Mikrob" All-Union Scientific Res. Inst. Plague Control, Saratov, USSR). *Arkh. Patol.* 39(5):59-63; 1977.

6037 NEURAL AND ENDOCRINE CONTROL SYSTEMS ACT ON THE POPULATION KINETICS OF THE INTEST EPITHELIUM. (Eng.) Tutton, P. J. M. (Dept. Anato Monash Univ., Clayton 3168, Australia). *Med. Biol.* 55(4):201-208; 1977.

6038 MALFUNCTION OF INTESTINAL MUCUS AND MUCUS PRODUCTION. (Eng.) Forstner, G.; Sturgess, J.; Forstner, J. (Hosp. Sick Children, 555 University Ave., Toronto, Ontario M5G 1X8, Canada). *Adv. Exp. Med. Biol.* 89:349-369; 1977.

6039 NUCLEAR UPTAKE OF CHOLECALCIFEROL METABOLITES IN RAT DUODENAL MUCOSA. (Eng.) Bachelet, M.; Ulmann, A.; Cloix, J. F.; Funck-Brentano, J. L. (INSERM U-90, Hopital Necker, 161, rue de Sevres, 75730, Paris Cedex 15, France). *J. Steroid Biochem.* 8(10):1047-1049; 1977.

See also, 5857, 5864, 5867, 5889, 5904, 5910, 5922, 6041, 6044, 6054, 6200, 6219, 6338, 6410.

GENERAL

6040 PRIMATE MESENTERIC BLOOD FLOW: EFFECTS OF VASOPRESSIN AND ITS ROUTE OF DELIVERY. (Eng.) Freedman, A. R.; Kerr, J. C.; Swan, K. G.; Hobson, R. W., II. (Coll. Medicine and Dentistry, of New Jersey--New Jersey Medical Sch., 100 Bergen St., Newark, NJ 07103). *Gastroenterology* 74(5, Part 1):875-878; 1978.

To investigate whether vasopressin is largely inactivated by a single passage through the liver (in which case its effects on the mesenteric circulation should be far greater after intra-arterial than after i.v. administration) or whether it is eliminated primarily via renal glomerular filtration (in which case the route of administration should not influence the drug's effect on regional circulations), the effects of vasopressin on blood flow in the superior mesenteric artery and on mean arterial pressure and portal venous pressure were measured in seven rhesus monkeys. Vasopressin (5×10^{-5} to 5×10^{-2} U/kg) was injected, as either a bolus, or infused both i.v. and intra-arterially to assess the influence of the route of administration upon hemodynamic responses. Dose-dependent decreases in superior mesenteric arterial flow were observed during both intra-arterial and i.v. injections of vasopressin. No statistically significant differences between the two routes of administration, the decreases in flow, and changes in pressure were observed. These observations suggest that i.v. administered vasopressin will be as effective as intra-arterially administered vasopressin in reducing mesenteric blood flow, and thus portal venous pressure, in man. Hence, there is little evidence to favor the intra-arterial use of vasopressin clinically.

6041 THE EFFECTS OF CHOLERA TOXIN ON INTRAMURAL BLOOD FLOW DISTRIBUTION AND CAPILLARY HYDRAULIC CONDUCTIVITY IN THE CAT SMALL INTESTINE. (Eng.) Cedgard, S.; Hallback, D. A.; Jodal, M.; Lundgren, O.; Redfors, S. (Dept. Physiology, Univ. Goteborg, Sweden). *Acta Physiol. Scand.* 102(2):148-158; 1978.

To investigate the possible involvement of circulatory parameters in the pathogenesis of the fluid losses in cholera, blood flow distribution to the mucosa-submucosa and to the muscularis in the cat small intestine was investigated with a ^{85}Kr-elimination technique before and after exposing the intestinal mucosa for 30 min to cholera enterotoxin (50-200 mg/10 cm of intestine). In all experiments, the toxin induced an intestinal secretion. Concomitantly, total intestinal blood flow was increased to a level 50% above control 3 hr after exposure. This vasodilatation reflected a doubling of mean blood flow in the mucosa-submucosa, while muscularis blood flow remained unchanged. In another series of experiments, the effect of cholera toxin on intestinal capillary hydraulic conductivity was investigated by determining the capillary filtration coefficient (CFC). A slight increase in CFC was noted during the 3-hr observation period, but this was not more pronounced than would have been expected from the concomitant vasodilatation. It is concluded that hemodynamic changes in the intestinal mucosa may be one of the several factors that probably are involved in the pathogenesis of cholera.

6042 ELECTROSURGICAL TREATMENT OF EXPERIMENTAL BLEEDING CANINE GASTRIC ULCERS: DEVELOPMENT OF A COMPUTER CONTROL AND A BETTER ELECTRODE. (Eng.) Piercey, J. R. A.; Auth, D. C.; Silverstein, F. E.; Willard, H. R.; Dennis, M. B.; Ellefson, D. M.; *et al.* (Dept. Medicine, Univ. Washington, Seattle, WA 98195). *Gastroenterology* 74(3):527-534; 1978.

An analogue computer that can be inserted in the circuit between a commercial electrosurgical generator and the active electrode is described for the electrosurgical treatment of gastrointestinal bleeding. The efficacy and safety of this technique was tested in experimental bleeding gastric ulcers in dogs. The computer can record the actual energy delivered to the tissue at any arbitrary generator setting. Additionally, it can deliver a predetermined amount of energy by continuously adjusting the voltage of the generator to compensate for changes in the tissue impedance during electrocoagulation (power leveling). A special electrode was devised to assure the reproducibility of the area of tissue contact. By using a force gauge at laparotomy with a predetermined energy of 20 joules, the effect of electrode pressure on the depth of injury was measured. Light pressure (1.3 newtons/cm^2) injured a mean of 36% and moderate pressure (6.4 newtons/cm^2) a mean of 87% of gastric wall thickness. Electrocoagulation applied in the clinical manner, or predetermined by power leveling, stopped all bleeding from experimental gastric ulcers with the same amount of energy for each method. Similarly, chronic studies of the depth of injury with each method of electrocoagulation showed no difference. Furthermore, the whole thickness of the gastric wall was injured in 4% of ulcers treated, and there was no significant difference between the two methods of applying the electrocoagulation. Thus, despite the ability to control energy delivered during monopolar electrocoagulation of experimental gastric ulcers, the depth of injury to the gastric wall is unpredictable and, at times, excessive. Further studies of other types of electrocoagulation are needed and will be facilitated by the availability of this computer-controlled electrosurgical generator.

6043 METABOLIC RESPONSES TO ENTERAL AND PARENTERAL NUTRITION.

(Eng.) Lickley, H. L. A.; Track, N. S.; Vranic, M.; Bury, K. D. (Women's Coll. Hosp., 76 Grenville St., Toronto, Ontario M5S 1B2, Canada). *Am. J. Surg.* 135(2):172-176; 1978.

The metabolism of enteral and parenteral diets were compared to gain information on differences in hormone release with the two routes of administration. Seven pairs of Wistar rats were simultaneously infused with a chemically formulated nutritionally complete amino acid-glucose diet that was delivered, at the same rate, into a central vein or into a feeding gastrostomy. The intragastrically infused rats showed greater weight gain than did the i.v. infused rats ($p<0.05$). This could not be explained by fluid retention, since intake and output were similar in the two groups of animals. There was a greater increase in serum immunoreactive insulin (IRI) at day 8 in the intragastrically infused animals, but a smaller increment in serum immunoreactive pancreatic glucagon (IRG) at that point. Levels of enteroglucagon or glucagon-like immunoreactivity (GLI) were maintained in the intragastrically infused rats but declined markedly in the i.v. infused rats ($p<0.02$) in comparison with that in the intragastrically infused rats after day 8. It is possible that the greater release of IRI seen with the intragastric amino acid-glucose feeding contributes to better disposal of nutrients and greater weight gain. The presence of nutrients in the intestinal lumen may have stimulated the release of GLI, which in turn is insulinotropic.

6044 IMMUNOLOGICAL STUDIES IN ULCERATIVE COLITIS: EXTRACTION, FRACTIONATION, AND IMMUNOLOGICAL CHARACTERIZATION OF GERM-FREE RAT COLON ANTIGEN.

(Eng.) Carlsson, H. E.; Sundblad, G.; Hammarstrom, S.; Perlmann, P.; Gustafsson, B. E. (Dept. Immunology, Univ. Stockholm, S-106 91 Stockholm, Sweden). *Arch. Biochem. Biophys.* 187(2): 366-375; 1978.

Studies were carried out to purify and define the antigen(s) against which patients with ulcerative colitis have antibodies. Intestinal mucins from germ-free rats contained antigens reactive with sera from patients with ulcerative colitis, in addition to human blood group A- and H-like antigens. A crude antigen extract was obtained by phenol-water extraction at 65 C. Two intestinal glycoproteins were purified from the extract by fractionated ethanol precipitation, ion-exchange chromatography, and gel filtration. The glycoproteins (2aI and 4aIIb) were homogeneous in regard to electrical charge and molecular size. Both were glycoproteins of the blood group-substance type. Component 2aI was very rich in *N*-acetylgalactosamine and threonine and low in *N*-acetylglucosamine and sialic acid(s). It had strong blood group A-like activity, weak blood group H activity, and no colon antigen activity as defined by patients' sera. Component 4aIIb was rich in sialic acid(s). About 40% of the sera from patients with ulcerative colitis reacted with this component. No blood group A- or H-like activity could be demonstrated. Colon antigen activity was sensitive to periodate oxidation (0.02 M $NaIO_4$, pH 4.0, 4 C, 18 hr) but resistant to boiling at neutral pH. It was very sensitive to acid hydrolysis (0.01 M HCl, 100 C). In fact, colon antigen activity was significantly reduced when subjected to weak acid hydrolysis under conditions that only appeared to release sialic acids. Further studies are needed to resolve the complex antibody reactivity pattern of sera from patients with ulcerative colitis to colon antigen.

6045 USE OF ARGON LASER IN THE TREATMENT OF EXPERIMENTALLY INDUCED UPPER GASTROINTESTINAL BLEEDING IN PRIMATES.

(Eng.) Butler, M. L.; Morris, W. (Letterman Army Medical Center, Presidio of San Francisco, CA 94129). *Gastrointest. Endosc.* 24(3):117-118; 1978.

The feasibility of using laser photocoagulation in the treatment of upper gastrointestinal bleeding was studied in rhesus monkeys with experimental gastric and duodenal bleeding. Lesions were made using a modified biopsy forceps. Stomach lesions treated by laser irradiation stopped bleeding in an average time of 122 sec, using an average photocoagulation time of 38.8 sec. Lesions left untreated in the stomach bled for an average of 276 sec. In only one animal, bleeding continued after 15 min despite laser therapy. In the duodenum, laser photocoagulated lesions required an average of 110 sec to stop bleeding, while control lesions averaged 190 sec. The average coagulation time with the laser was 28.5 sec. While laser coagulation of mucosal hemorrhage has been found feasible in this primate model, the authors caution that further experimentation is needed before the method is clinically applied in man.

5046 INVESTIGATION OF THE RESORPTION AND RETENTION OF RADIOACTIVE SULFUR IN ALBINO RATS FOLLOWING THE ADMINISTRATION OF ^{35}S-LABELED 3, 5-DIBENZYL-2-THIONO-1,3,5-TETRAHYDROTHIADIAZINE D 47), A SYNTHETIC MUSTARD OIL. (Ger.) Drauschke, V.; Grahl, R. (Zentrallabor der Sektion Pflanzenroduktion, Martin-Luther-Universitat Halle, Emile-bderhalden-Str. 25b, 401 Halle, E. Germany). *Isotopenpraxis* 13(10):352-358; 1977.

5047 ENTERIC RESISTANCE AND COXSACKIEVIRUS B. (Eng.) Kibrick, S.; Loria, R. M. (Boston Univ. Sch. Medicine, 80 E. Concord St., Boston, MA 02118). *Am. J. Clin. Nutr.* 30(11):1871-1875; 1977.

5048 THE GUINEA PIG AS A MODEL FOR THE ASYMPTOMATIC HUMAN TYPHOID CARRIER. (Eng.) Lavergne, G. M.; James, H. F.; Martineau, C.; Diena, B. B.; Lior, H. (Animal Resources Div., Health and Welfare Canada, Tunney's Pasture, Ottawa K1A OL2, Canada). *Lab. Anim. Sci.* 27(5, Part 2): 06-816; 1977.

5049 INVESTIGATIONS ON TENSILE STRENGTH OF INTESTINAL ANASTOMOSIS IN PHARMACOLOGICALLY NDUCED BLOOD CLOTTING DISTURBANCES. (Eng.) Goralski, S. A.; Wichrzycka, E.; Wieczorek, K.; Szczepanik, A. B.; Rudowski, W. J.; Schier, J. F. (Inst. Hematology, ul. Chocimska 5, 00-957 Warszawa, Poland). *Z. Exp. Chir.* 10(6):357-360; 1977.

5050 SOME HUMAN PHYSIOLOGICAL RESPONSES TO THE CONSUMPTION OF GLUCOSE SYRUPS AND RELATED CARBOHYDRATES. (Eng.) Birch, G. G.; Kearsley, M. . (Natl. Coll. Food Technology, Univ. Reading, St. Georges Ave., Weybridge, Surrey, England). *Staerke* 29(10):348-352; 1977.

6051 ATTEMPTS TO PRODUCE SALIVARY CYSTS IN THE DOG. (Eng.) DeYoung, D. W.; Kealy, J. K.; Kluge, J. P. (Dept. Veterinary Clinical Sciences, Iowa State Univ., Ames, IA 50011). *Am. J. Vet. Res.* 39(1):185-186; 1978.

6052 THE BLOOD SUPPLY OF THE ABDOMINALLY-PLACED VERTICAL SIGMOID COLON. (Eng.) Roberts, W. H.; Engen, P. (Dept. Anatomy, Loma Linda Univ., Loma Linda, CA 92354). *Anat. Anz.* 142(3):165-167; 1977.

6053 URINARY EXCRETION OF DYE IN DOGS INFUSED WITH BSP OR ITS GLUTATHIONE CONJUGATE. (Eng.) Barnhart, J. L.; Combes, B. (Southwestern Medical Sch. at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235). *Am. J. Dig. Dis.* 23(1):65-71; 1978.

6054 OSMOTIC VASODILATION IN THE SMALL INTESTINE [Abstract]. (Eng.) Granger, D. N.; Levine, S. E.; Brace, R. A.; Taylor, A. E. (Univ. Mississippi Medical Center, Jackson, MS). *Physiologist* 20(4):37; 1977.

6055 PANCREATIC VASODILATATION INDUCED BY HYPEROSMOLALITY [Abstract]. (Eng.) Jarhult, J.; Thulin, A. (Univ. Hosp., Lund, Sweden). *Ir. J. Med. Sci.* 146(Suppl. 1):46-47; 1977.

See also, 5888, 5906, 6031, 6059, 6199.

DIAGNOSTIC PROCEDURES

6056 HIGH DENSITY, LOW VISCOSITY BARIUM FOR FINE MUCOSAL DETAIL ON DOUBLE-CONTRAST UPPER GASTROINTESTINAL EXAMINATIONS.

(Eng.) Gelfand, D. W. (Bowman Gray Sch. Medicine, Winston-Salem, NC 27103). *Am. J. Roentgenol.* 130(5):831-833; 1978.

A high density, low viscosity barium suspension was developed to maximize demonstration of very small mucosal details on double-contrast upper gastrointestinal examinations. The barium sulfate suspension was formulated using a considerable proportion of large particles (up to 20 μm), thus increasing the potential packing density and decreasing viscosity by decreasing the relative amount of water adsorbed onto the surface of the particles. A low molecular weight dispersant (sodium citrate) was included. Dimethylpolysiloxane was added as an antifoaming agent and sorbitol as a stabilizer. The suspension is capable of 250% weight/volume densities without mechanical mixing, while retaining a low viscosity. *In vitro* tests showed the material to be superior to suspensions of greater viscosity and/or more moderate density in demonstrating fine surface detail. Clinical experience with more than 3,000 examinations with the 250% weight/volume barium suspension has shown the material to be capable of demonstrating areae gastricae or similar fine nodular patterns in approximately 70% of studies. Although a particular preparation has been described, the underlying principles are thought to be generally applicable.

6057 STIGMATA OF RECENT HAEMORRHAGE IN DIAGNOSIS AND PROGNOSIS OF UPPER GASTROINTESTINAL BLEEDING.

(Eng.) Foster, D. N.; Miloszewski, K. J. A.; Losowsky, M. S. (Birch Hill Hosp., Rochdale, Lancastershire, England). *Br. Med. J.* 1(6121):1173-1177; 1978.

To determine satisfactory criteria for identifying patients at high risk of rebleeding after an initial upper gastrointestinal hemorrhage, 245/277 consecutive episodes of suspected upper gastrointestinal bleeding were examined endoscopically. The usefulness of emergency endoscopy in these cases was also assessed. Lesions bearing stigmata of recent hemorrhage were found in 110 of 233 patients who were judged to have bled; 78 had lesions without stigmata and in 45 no lesion was seen. Results in 176 entirely unselected admissions for upper gastrointestinal bleeding were similar: of 153 who underwent endoscopy, 77 had lesions with stigmata, 46 had lesions without stigmata, and 30 had no lesion. Forty-eight chronic duodenal and 41 chronic gastric ulcers were identified by endoscopy. Stigmata were found in 27 and 33 of these cases, resp. Sixteen patients had multiple lesions, and in 12, the presence of stigmata permitted diagnosis of the source of the hemorrhage. Stigmata were more likely to be seen in cases of duodenal ulcer ($p<0.006$), Mallory-Weiss lesions ($p<0.086$), and esophageal varices ($p<0.057$) when endoscopy was performed within 12 hr of bleeding, but were equally common in cases of gastric ulcer after both short and long intervals. In the absence of stigmata, 21 patients with duodenal ulcer had further hemorrhage, and 1 other needed emergency surgery; no patient with gastric ulcer had further hemorrhage or needed emergency surgery. In contrast, when stigmata were present 15/27 patients with duodenal ulcer had further hemorrhage and 17/27 needed emergency surgery; of the 33 patients with gastric ulcer, 10 had further hemorrhag and 15 required emergency surgery. Superficial mucosal lesions may have been the source of hemorrhage when an ulcer unmarked by stigmata was seen a endoscopy. Stigmata were superior to any other single factor or combination of factors in predicting rebleeding and the need for emergency surgery.

6058 BENIGN RETROPERITONEAL EMPHYSEMA ASSOCIATED WITH UPPER GASTROINTESTINAL ENDOSCOPY.

(Eng.) Martin, W. C.; Nagai, N.; Diner, W.; Texter, C., Jr. (Univ. Arkansas for Medical Sciences, 4301 W. Markham St., Little Rock, AR 72201). *Arch. Intern. Med.* 138(5):759-761; 1978.

Two cases of retroperitoneal emphysema and one cas of coexistent retroperitoneal emphysema and pneumoperitoneum that developed after upper gastrointestinal (GI) endoscopy are presented. An 80-yr-old woman developed pneumoperitoneum and retroperitone emphysema following a GI series. Barium leakage did not occur, and she recovered uneventfully. A 75-yr-old woman underwent endoscopy for evaluation of epigastric pain; 5 days later, an i. pyelogram revealed a bubbly lucency around both kidneys, gas at the top of the right kidney, and psoas shadows outlined by gas. Pancreatic body cancer and widespread intra-abdominal metastasis were found at laparotomy. In the third case, a 55 yr-old man developed asymptomatic retroperitoneal emphysema one day after gastroduodenoscopy; bubbly lucencies surrounded the right kidney and psoas shadow and extended up to the right hemidiaphragm. The last two cases also resolved spontaneously. It must be expected that, because of the increased frequency of endoscopic and associated procedures, retroperitoneal emphysema may become more common.

6059 RADIONUCLIDE IMAGING OF BOWEL INFARCTION COMPLICATING SMALL BOWEL INTUSSUSCEPTION IN DOGS.

(Eng.) Kressel, H. Y.; Moss, A. A.; Mon gomery, C. K.; Brito, A. C.; Hoffer, P. B. (Hosp. Univ. Pennsylvania, Philadelphia, PA 19104). *Invest. Radiol.* 13(2):127-131; 1978.

Technetium-99m (^{99m}Tc)-pyrophosphate was investigated for use as an indicator of intestinal infarction in intussuscepted bowel. ^{99m}Tc-pyrophosphate was injected i.v. 24 and 48 hr following the creation of irreducible intussusceptions in eight adult dogs. In six dogs, infarction develop in the intussusception, and each demonstrated increased uptake of ^{99m}Tc-pyrophosphate on *in vivo* scintiscans. The two dogs without infarction show no increased uptake of the radionuclide. Well-counting and specimen scanning confirmed increased radionuclide in the infarcted intussusceptions. These observations suggest that ^{99m}Tc-pyrophosphat is a reliable indicator of the vascular compromise that sometimes occurs with intestinal intussusception.

)60 THE ENZYME LINKED IMMUNOSORBENT ASSAY IN THE DIAGNOSIS OF HUMAN BILHARZIASIS [sic].

:ng.) Farag, H. F.; Barakat, R. M. R. (Medical Res.
ıst., 165 El Horreya Ave., El Hadara, Alexandria,
;ypt). *Tropenmed. Parasitol.* 29(1):12-14; 1978.

ıe sera of 72 patients with *Schistosoma mansoni*
ıd/or *S. hematobium* ova in their stools or urine,
) persons without ova but from schistosomiasis-
ıdemic areas, and 9 healthy persons from areas
.thout schistosomiasis were examined by enzyme-
ined immunosorbent assay (ELISA) to evaluate the
;e of ELISA in the diagnosis of human bilharziosis.
:tinction was measured spectrophotometrically at
)0 nm. The extinction values were 0.088 ± 0.0193,
266 ± 0.1177, 0.547 ± 0.2426, and 0.559 ± 0.2189
›r the 9 controls, 6 patients with *S. hematobium*,
} with *S. mansoni*, and 33 with both parasites, resp.;
ıe values for all patients were significantly dif-
:rent (p<0.0005) from the controls. Among the 16
:sults. No false-negative cases were recorded.
ıe false-positive results may have been due
› cross reactions, a history of schisto-
omiasis, or a low worm burden that escaped clinical
:tection (as in an early stage of infection, as
il the false-positive subjects were 10-15 yr old).
.ISA is a very sensitive and accurate test for the
iagnosis of human bilharziosis.

)61 DIAGNOSIS OF EXOCRINE PANCREATIC INSUFFICIENCY IN CYSTIC FIBROSIS BY THE SYNTHETIC :PTIDE N-BENZOYL-L-TYROSYL-p-AMINOBENZOIC ACID.

:ng.) Nousia-Arvanitakis, S.; Arvanitakis, C.;
:eenberger, N. J. (Kansas Univ. Medical Center,
ıinbow Blvd. at 39th St., Kansas City, KS 66103).
Pediatr. 92(5):734-737; 1978.

ıe urinary excretion of para-aminobenzoic acid
'ABA) following the administration of *N*-benzoyl-L-
'rosyl-PABA was evaluated in 24 patients with cys-
.c fibrosis (CF) and 14 controls as an index of
:ocrine pancreatic function to determine its role
ı the diagnosis of exocrine pancreatic insuffi-
iency. Cumulative percent PABA recovery in 6 hr
ıs significantly lower in CF patients compared with
ıe control group (mean 37% versus 70%, p<0.001).
) overlap was noted between the two groups. There
ıs good correlation between PABA recovery (p<0.001),
:cal chymotrypsin activity (r=0.64, p<0.01), and
›efficient of fat absorption (r=0.66, p<0.01).
ıese findings indicate that PABA recovery is sig-
.ficantly reduced in patients with CF and steator-
ıea and may prove a practical and reliable test of
ıncreatic insufficiency.

)62 ALPHA$_1$-FETOPROTEIN IN THE DIAGNOSIS OF HEPATOMA: STATISTICAL AND COST BENEFIT SPECTS.

(Eng.) Phillips, P. J.; Rowland, R.;
:id, D. P.; Coles, M. E. (Inst. Medical and Veter-
ıary Science, Frome Rd., Adelaide, South Australia
)00, Australia). *J. Clin. Pathol.* 30(12):1129-1133;
)77.

:udies were carried out to determine a diagnostic
lpha$_1$-fetoprotein (AFP) concentration in the sera
f hepatoma patients. Data on the sensitivity and specificity of different diagnostic AFP concentrations were taken from the literature and evaluated statistically and by Bayesian analysis. In 610 patients (hepatoma prevalence 0.028), it was calculated that a sensitive diagnostic concentration (30-50 ng/ml) will misdiagnose hepatoma so often that a positive test will indicate hepatoma in only 10% of cases. A positive test at a specific diagnostic concentration (500 ng/ml) indicates hepatoma in 100% of cases and is preferable in terms of cost benefit. Although the lower concentration will diagnose a larger proportion of patients with hepatoma (74% compared with 59%) the "costs" of excluding false positives are considerable (Australian $2,545 per extra case with 2.5% of patients suffering significant morbidity). In western societies, where the prevalence of hepatoma is low, a higher, less sensitive but more specific diagnostic serum AFP concentration is appropriate for use.

6063 THE DIAGNOSTIC VALUE OF LP-X DETERMINATIONS IN PATIENTS WITH LIVER DISEASE.

(Eng.) Ward, A. M. (Hallamshire Hosp., Sheffield, England). *Protides Biol. Fluids Proc. Colloq.* 25: 333-336; 1977.

The value of lipoprotein X (LP-X) determinations as an additional assessment of cholestasis was examined by analyzing serum samples from a series of 456 consecutive patients with jaundice or other clinical evidence of liver disease. The patients were divided into four major groups (prehepatic disease, 105 patients; hepatocellular disease, 138; extrahepatic biliary and pancreatic disease, 60; malignant disease, 88) and the results of the LP-X assay were compared with the histological and biochemical profiles of each patient to examine the degree of correlation. In the group with prehepatic disease, the two patients with jaundice (postoperative) by histological and biochemical criteria were also LP-X positive. In the group with hepatocellular disease, histology and biochemistry detected 51 cases of essentially intrahepatic cholestasis, but only 32/51 were LP-X positive, and 1 case was LP-X-positive but negative by histology and biochemistry. There was excellent correlation between LP-X and histology/biochemistry determinations in the group with extrahepatic biliary and pancreatic disease (59/74, plus 1 LP-X-positive but histology/biochemistry-negative) with two major exceptions: (1) in cholelithiasis and biliary colic, the LP-X level returned to normal faster than did the enzyme data following passage of the stone, so that six patients with biochemical evidence of cholestasis were LP-X-negative and (2) LP-X determination was unreliable in drug-induced cholestasis (4/6 due to estrogen and 2/8 due to chlorpromazine were LP-X-negative). LP-X determination and the histology/biochemistry profile were in good agreement in cases of malignant disease (17/21, plus 1 LP-X-positive but histology/biochemistry-negative case). LP-X levels were not related to levels of cholesterol, adenosine deaminase, γ-glutamyl transpeptidase, or alanine amino transferase. There was a positive correlation between the levels of LP-X and of bilirubin, alkaline phosphatase, and 5'-nucleotidase, and there was a negative correlation between LP-X and aspartate amino transferase levels.

6064 THE VALIDITY OF ^{99m}Tc-PYRIDOXYLIDENEGLUTAMATE (P.G.) CHOLESCINTIGRAPHY AS A DIAGNOSTIC TEST FOR CHOLECYSTITIS.

(Eng.) Stadalnik, R. C.; Kraus, J. F.; Matolo, N. M.; Krohn, K. A. (Sacramento Medical Center-UCD, 4301 X St.-Unit I, Sacramento, CA 95817). *Clin. Nucl. Med.* 3(4): 142-146; 1978.

The diagnostic value of technetium-99m-pyridoxylideneglutamate cholescintigraphy (^{99m}Tc-PGC) was studied in patients with and without cholecystitis, and its validity was compared with oral cholecystography (OC) and ultrasonography (US). ^{99m}Tc-PGC was applied to 50 patients with acute, subacute, and/or chronic cholecystitis with cystic duct obstruction proven histologically and operatively, and also to 27 healthy volunteers and 43 patients with upper right quadrant abdominal pain who subsequently were proven free of gallbladder disease. In addition, 38 patients had OC and 31 had US performed. The sensitivity and specificity of ^{99m}Tc-PGC were 100%. For OC the sensitivity was 87%, and the specificity was 100%. For US the sensitivity was 70%, and the specificity was 93%. The repeatability of ^{99m}Tc-PGC, OC, and US were 100%, 94% and 81%, resp. These data show that ^{99m}Tc-PGC, a safe and simple technique, is a valid diagnostic tool in the evaluation of patients with cholecystitis.

6065 CHOLECYSTOSONOGRAPHY FOR THE DIAGNOSIS OF CHOLECYSTOLITHIASIS.

(Eng.) Dempsey, P. J.; Phillips, J. F.; Warren, D. L.; Donovan, A. J. (Univ. South Alabama Coll. Medicine, Mobile, AL). *Ann. Surg.* 187(5):465-474; 1978.

Among more than 1,000 cases in which abdominal ultrasound was used because of a suspicion of cholelithiasis with or without obstructive cholecystopathy, the presence or absence of cholelithiasis was established in 86 cases either by surgery or by cholangiographic visualization of the gallbladder. A review of these latter cases is presented. The indications for ultrasound were acute right upper quadrant syndrome (53 cases), cholestasis and hepatic dysfunction (11), confirmation of oral cholangiogram (21), and allergy to iodine-containing dye (1). The gallbladder can be visualized by ultrasound (cholecystosonography) and gallstones seen as echo-producing densities. Under cholecystosonographic observation, the gallbladder can be demonstrated to contract following stimulation by cholecystokinin. This establishes patency of the cystic duct and excludes a diagnosis of acute obstructive cholecystopathy. The gallbladder was visualized in 84/86 patients. Stones were identified sonographically in 64% of 42 patients with proven gallstones (75% of the last 20 cases). The gallbladder contracted following stimulation in 18 of 20 cases with a patent cystic duct. Cholecystosonography is simple, safe, and economical. Cholecystosonography with cholecystokinin stimulation is the first diagnostic study of choice when cholecystolithiasis is suspected and the above-named indications exist. Cholecystosonography may detect gallstones in a gallbladder visualized by oral cholangiography when stones are of the same density as the contrast media.

6066 SONOGRAPHY OF THE COMMON BILE DUCT: VALUE OF THE RIGHT ANTERIOR OBLIQUE VIEW.

(Eng.) Behan, M.; Kazam, E. (Hammersmith Hosp., London W.12, England). *Am. J. Roentgenol.* 130(4): 701-709; 1978.

A method of visualizing the normal or dilated common duct by gray scale ultrasonography is described this method overcomes problems such as difficulty in differentiating between the portal vein and the mildly dilated common hepatic and common bile ducts The patient is scanned longitudinally from the righ anterior abdominal wall with the ultrasound beam directed posteromedially until two tubular structures are demonstrated in the porta hepatis. The more anterior tubular structure in this projection is the common duct. If the common duct is less than 3 mm in diameter, it may not be clearly delineated. In these cases, the absence of common duct dilatation can be inferred. The usefulness of this view for detecting common duct dilatation was evaluated in 101 consecutive cases proven by surgery, autopsy, or cholangiography. The overall accuracy was 96% (4 false-negative studies, no false positives). It is concluded that sonography should be the imaging procedure of choice for suspected extrahepatic biliary obstruction if the serum bilirubin level precludes i.v. cholangiography.

6067 SERUM ISOAMYLASE CHANGES FOLLOWING ENDOSCOPY.

(Eng.) Pelot, D.; Berk, J. E.; Fridhandler, L. (Univ. California Irvine Medical Center, 101 City Drive South, Orange, CA 92668). *Gastrointest. Endosc.* 24(4):166-168; 1978.

Serum amylase changes are reviewed in patients who underwent endoscopic retrograde cholangiopancreatography (ERCP) and upper gastrointestinal endoscopy. Hyperamylasemia occurred in 24 of 36 patients in whom ERCP was performed. The rise was predominantly of pancreatic (P-type) isoamylase in 20 of the 24 with hyperamylasemia and of salivary (S-type) in the remaining 4. In patients in whom the pancreatic duct was visualized, alone or together with the common bile duct, 81.8% displayed hyperamylasemia. Isoamylase analysis revealed that the rise in amylase activity in this particular group was predominantly in P-type isoamylase. By contrast, only 1 of 23 patients with normal pre-examination amylase values who underwent esophagogastroduodenoscopy without attempted cannulation of either the bile or pancreatic duct displayed hyperamylasemia. It is concluded that hyperamylasemia developing after ERCP in which the pancreatic duct had been opacified probably reflect an induced pancreatic alteration.

6068 RADIOANATOMY OF THE SPHINCTER OF ODDI IN MEDICAL CHOLANGIOGRAPHY. (Eng.) Lamarque, J. L.; Bruel, J. M.; Dondelinger, R.; Senac, J. P.; Polge, D.; Rabischong, P.; Bonnel, F. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 30-35; 1977.

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6071 TECHNETIUM-99m-LABELLED DIETHYL-ACETANILIDO-IMINODIACETATE. A NEW HEPATOBILIARY AGENT: A PRELIMINARY REPORT. (Eng.) Tjen, H. S. L. M.; van der Pompe, W. B.; Cox, P. H. (Rotterdamsch Radio-Therapeutisch Instituut, Groene Hilledijk 301, Rotterdam, Netherlands). *Br. J. Radiol.* 50(598):735-739; 1977.

6072 IDENTIFICATION OF INTESTINAL GALLIUM COLLECTION BY IMAGING THE UPPER GASTROINTESTINAL TRACT USING ^{99m}Tc GIVEN ORALLY. (Eng.) Ladwig, S. H.; Wahner, H. W. (Mayo Clinic, 200 First St. S.W., Rochester, MN 55901). *Clin. Nucl. Med.* 2(10):344-347; 1977.

6073 UPPER GASTROINTESTINAL HEMORRHAGE--DIAGNOSIS AND MANAGEMENT. (Eng.) Midgley, R. C.; Cantor, D. (Dept. Internal Medicine, Univ. California, Davis, Professional Building, 4301 X St., Sacramento, CA 95817). *West. J. Med.* 127(5):371-377; 1977.

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6075 EVALUATION OF Tc-99m PYRIDOXAL-PHENYLALANINE AS A HEPATOBILIARY IMAGING AGENT. PART 1. EXPERIMENTAL STUDIES. (Eng.) Fotopoulos, A.; Chiotelis, E.; Koutoulidis, C.; Dassiou, A.; Papadimitriou, J. (Aretaiion Hosp., 76, Vassilissis Sophias St., Athens, T610, Greece). *J. Nucl. Med.* 18(12):1189-1193; 1977.

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6078 A STUDY OF ANTIBODY PRODUCTION FOR THE RADIOIMMUNOASSAY OF GASTRIN. (Eng.) Fabri, P. J.; McGuigan, J. E. (Univ. Florida Coll. Medicine, Gainesville, FL 32610). *Am. J. Dig. Dis.* 22(10):902-908; 1977.

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6080 INTRAOPERATIVE MEASUREMENT OF THE BILE FLOW RESISTANCE IN THE TERMINAL PORTION OF THE COMMON BILE DUCT AND ITS CLINICAL SIGNIFICANCE IN BILIARY SURGERY. (Eng.) Tomita, T.; Uekusa, M. (Natl. Tochigi Hosp., 1-10, Nakatomatsuri, Utsunomiya City, Tochigi-ken 320, Japan). *Gastroenterol. Jpn.* 12(3):209-217; 1977.

6081 FIBEROPTIC ENDOSCOPY OF THE DIGESTIVE TRACT IN PEDIATRICS. (Eng.) Guastavino, E.; Ortiz, J. P.; Toccalino, H.; Martini, E. R. (Hospital Prof. "Alejandro Posada," Martinez de Hoz y Marconi, Haedo Norte, Argentina). *Arq. Gastroenterol.* 14(3):163-166; 1977.

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6083 ACCURACY OF BILIARY DUCT ULTRASOUND: COMPARISON WITH CHOLANGIOGRAPHY. (Eng.) Neiman, H. L.; Mintzer, R. A. (McGaw Medical Center, Northwestern Univ., 303 E. Chicago Ave., Chicago, IL 60611). *Am. J. Roentgenol.* 129(6):979-982; 1977.

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6087 LAPAROSCOPIC DIAGNOSIS OF INTRA-ABDOMINAL METASTASES OF EXTRA-ABDOMINAL TUMORS. (Rus.) Sotnikov, V. N.; Agamov, A. G.; Erokhin, P. G. (N. I. Pirogov Second Medical Inst., Moscow, USSR). *Vopr. Onkol.* 23(9):38-44; 1977.

6088 CARCINOEMBRYONIC ANTIGEN IN MALIGNANCY OF THE GASTROINTESTINAL TRACT. (Ger.) Auer, I. O. (Med. Univ.-Klinik, Josef-Schneider-Strasse 2, D-8700 Wurzburg, W. Germany). *Z. Gastroenterol.* 15(9):543-552; 1977.

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6094 OPACIFICATION OF THE BILE DUCTS BY ORALLY ADMINISTERED CONTRAST MEDIA IN HOSPITALIZED PATIENTS. IS IT STILL NECESSARY IN 1977? [Abstract]. (Fre.) Dubois, A.; Bruel, J. M.; Lamarqu J. L.; Michel, H. (Hopital St. Eloi, F 34059 Montpellier, France). *Gastroenterol. Clin. Biol.* 1 (8/9):710; 1977.

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See also, 5948, 6006, 6122, 6129, 6134, 6135, 6148, 6156, 6158, 6166, 6170, 6174, 6182, 6202, 6205, 6237, 6247, 6261, 6264, 6265, 6266, 6277, 6286, 6308, 6312, 6313, 6318, 6320, 6324, 6327, 6328, 6330, 6340, 6352, 6355, 6391, 6392, 6401, 6408, 6409, 6437, 6438, 6470, 6471, 6472, 6474, 6488, 6489, 6495, 6499, 6500, 6508, 6526, 6533, 6543, 6549, 6558.

GASTROINTESTINAL DISEASES

ESOPHAGUS

5096 ORAL CIMETIDINE IN REFLUX ESOPHAGITIS: A
DOUBLE BLIND CONTROLLED TRIAL. (Eng.)
esdorp, E.; Bartelsman, J.; Pape, K.; Dekker, W.;
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24; 1978.

he efficacy of cimetidine therapy (1.6 g/day) was
valuated in a double-blind placebo-controlled trial
n 24 patients with moderate or severe peptic reflux
sophagitis. Cimetidine was superior to placebo
hen using endoscopic and histological criteria
p<0.01 and p<0.001, resp.). Improved patient
ymptomatology and lower antacid consumption failed
o reach statistical significance. No change in
he abnormally low lower esophageal sphincter pres-
ure was observed at the end of the trial. No
linical side-effects or significant biochemical
hanges were noted. Because of its efficacy, low
oxicity, and low incidence of side-effects, cimeti-
ine appears to be a useful drug in the medical
herapy of reflux esophagitis and could be a valu-
ble alternative to surgery in some cases.

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GASTROESOPHAGEAL JUNCTION: ENDOSCOPIC
OLLOW-UP STUDY. (Eng.) Appelqvist, P.; Virkkula,
.; Kalima, T. V. (Univ. Central Hosp., Haartman-
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orsch, E. R.; Graham, D. Y.; Lie, J. T.; Estrada,
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. J. (Univ. Miami Sch. Medicine, P.O. Box 520875,
iscayne Annex, Miami, FL 33152). *South Med. J.*
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. (Frenchay Hosp., Bristol, England). *World J.*
urg. 1(4):475-483; 1977.

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(Eng.) Anonymous. (No affiliation given).
r. Med. J. 2(6086):540; 1977.

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raham, D. Y.; Davis, R. E. (Baylor Coll. Medicine,
200 Moursund Ave., Houston, TX 77030). *Am. J. Dig.*
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6115 SURGICAL PROS AND CONS. (Eng.) Braslow, L.; Ellis, F. H., Jr. (No affiliation given). *Surg. Gynecol. Obstet.* 146(3):437; 1978.

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6119 MALLORY-WEISS SYNDROME [Abstract]. (Eng.) Takemoto, T. (Yamaguchi Univ. Sch. Medicine, Ube, Japan). *Gastroenterol. Jpn.* 12(4):339; 1977.

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6127 BLEEDING AT THE GASTROESOPHAGEAL JUNCTIO (Eng.) Katz, D.; Pitchumoni, C. S.; Thomas, E.; Antonelle, M. (New York Medical Coll., New York, NY 10029). *South. Med. J.* 71(Suppl. 1): 29-30; 1978.

6128 CURRENT TRENDS IN THE MANAGEMENT OF ESOPHAGEAL ATRESIA AND TRACHEOESOPHAGEAL FISTULA. (Eng.) Holder, T. M. (Children' Mercy Hosp., Kansas City, MO 64100). *Am. Surg.* 44(1):31-36; 1978.

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6130 DILATATION OF BENIGN ESOPHAGEAL STRICTURES BY PERORAL FIBERENDOSCOPIC BOUGIENAGE. (Eng.) Huchzermeyer, H.; Freise, J.; Becker, H. (Medizinische Hochschule, Karl-Wiechert-Allee 9, 3000 Hannover 61, W. Germany). *Endoscopy* 9(4):207-210; 1977.

6131 NON-SURGICAL TREATMENT OF CARDIO-ESOPHAGEAL OBSTRUCTION--ROLE OF ENDOSCOPY. (Eng.) Tytgat, G. N.; den Hartog Jager, F. C. (Wilhelmina Gasthuis, Eerste Helmersstraat 104, Amsterdam Oud-West, Netherlands). *Endoscopy* 9(4): 211-215; 1977.

6132 THE ENDOSCOPIC PICTURE OF THE INTRAMURAL OESOPHAGEAL DIVERTICULOSIS. (Eng.) Minnigerode, B.; Bartholome, W.; Kupper, R. (Univ.-Hals-Nasen-Ohrenklinik, Hufelandstrasse 55, 4300 Essen, W. Germany). *Endoscopy* 9(4):203-207; 1977.

6133 ESOPHAGOBRONCHIAL FISTULA SECONDARY TO RUPTURED TRACTION DIVERTICULUM. (Eng.) Balthazar, E. J. (New York Medical Coll., 5th Ave. and 106th St., New York, NY 10029). *Gastrointest. Radiol.* 2(2):119-121; 1977.

See also, 5871, 6056, 6057, 6058, 6073, 6081, 6141, 6145, 6147, 6156, 6163, 6200, 6204, 6458, 6467, 6468, 6506, 6508, 6525, 6540, 6543.

STOMACH

6134 RETAINED GASTRIC ANTRUM SYNDROME DIAGNOSED BY $[^{99m}\mathrm{Tc}]$PERTECHNETATE SCINTIPHOTOGRAPHY. IN MAN: HORMONAL AND RADIOISOTOPIC STUDY OF TWO CASES. (Eng.) Sciarretta, G.; Malaguti, P.; Turba, E.; Fini, A.; Verri, A.; Garagnani, B.; *et al.* (Via Oslavia, 5-40133, Bologna, Italy). *J. Nucl. Med.* 19(4):377-380; 1978.

To improve the differential diagnosis between gastrinoma and retained antrum syndrome (a rare condition, occurring in Billroth II (BII) gastrectomized patients, in which an ulcer recurs associated with high levels of circulating gastrin), two cases of retained antrum syndrome were studied both by gastrin tests (secretin, calcium, protein meal, and bombesin tests) and by $[^{99m}\mathrm{Tc}]$pertechnetate scintiphotography. By the latter method, a prominent area of activity was observed on the anatomic site of the duodenal stump bottom. It appeared after 20 or 30 min and lasted for the 2 hr of observation. After surgical resection, no area of activity was observed at the scintiphotographic follow-up. No false-positive was observed in the more than 30 subjects studied. Scintiphotography by pertechnetate seems able to demonstrate the presence and the size of retained gastric antrum in BII gastrectomized patients with recurrent ulcer.

6135 PROGRESS IN THE CYTOLOGICAL DIAGNOSIS OF GASTRIC LYMPHOMA. (Eng.) Cabre-Fiol, V.; Vilardell, F. (Hospital Santa Cruz y San Pablo, Barcelona 13, Spain). *Cancer* 41(4):1456-1461; 1978.

Experience with 32 cases of gastric lymphoma examined cytologically is reviewed to compare two techniques of diagnosis. In one series (1953-1972), a technique combining washings and abrasion under fluoroscopic control was used. A positive diagnosis of malignancy was made in 7 of 17 cases. In a recent series (1972-1976), 15 cases of gastric lymphoma were studied by direct abrasion during endoscopy. Malignant cells were identified in 13 cases and a correct diagnosis of lymphoma was made in 11 cases. Biopsy was positive for malignancy in 12 cases and lymphoma was specifically diagnosed in 9 instances. Combining cytology and biopsy, a diagnosis of cancer was made in 14 of 15 cases. Endoscopic cytology appears to be far superior to blind abrasion and washings techniques in the diagnosis of lymphoma of the stomach.

6136 IMMUNOLOGICAL STUDIES IN CHRONIC ATROPHIC GASTRITIS AND CHRONIC (SUPERFICIAL) GASTRITIS. (Eng.) Fung, W. P.; Rigby, R. J.; Trenchev, P.; Matz, L. R. (Royal Perth Hosp., Box X2213 GPO, Perth, Western Australia 6001, Australia). *Am. J. Gastroenterol.* 69(1):51-56; 1978.

Detection of autoantibodies, histocompatibility locus antigen (HLA) typing, and immunofluorescence studies on gastric biopsies were carried out in 19 subjects with histologically proven chronic atrophic gastritis (CAG) or chronic superficial gastritis (CG), to clarify the immunological status of gastritis. All patients were seronegative for parietal cell antibody and did not have pernicious anemia. Except for positive antismooth muscle and antimitochrondial antibodies in one patient with CAG, autoantibodies (antinuclear, smooth muscle, mitochrondrial, parietal cell) were absent in patients with CAG and CG. Immunofluorescence studies showed that IgG and IgA were present in the lamina propria of all patients with CAG or CG and of subjects with normal gastric histology. IgM was seen less often, in about half the cases. Complement component C3 was an uncommon finding, being positive only in one case with CAG and one case with CG and in none of the cases with normal gastric histology. Fibrinogen was more commonly seen in patients with CG (5/5 cases) than in those with CAG (3/11 cases). Fibrinogen was found in one patient with normal gastric histology. The most consistent fluorescence was obtained with antiparietal cell antiserum. All subjects with CAG showed negative or weak staining only. In contrast, subjects with CG and normal gastric histology had strong specific fluorescence. An increased frequency of HLA-A1 plus HLA-B8 was found in subjects with CAG (20.7% in controls, 40%

in CAG). The staining pattern in cases of CAG and CG does not suggest immune complex-mediated disease. The presence of fibrinogen and occasionally of C3 supports the idea that the staining is secondary to inflammation.

6137 DIFFUSE VARIOLIFORM GASTRITIS. (Eng.) Lambert, R.; Andre, C.; Moulinier, B.; Bugnon, B. (Hopital E.-Herriot, F-69374 Lyon Cedex 2, France). *Digestion* 17(2):159-167; 1978.

A description of diffuse varioliform gastritis (DVG), a subacute gastric disease characterized by large folds in the fundus and erosive mucosal bulgings disseminated in the fundus and antrum, is presented based on 90 cases of DVG documented during 8 yr (0.3% of examinations). Samples of the fundic and antral mucosae were taken in each patient, along with a fiber endoscopic exploration of the stomach. Epigastric pain simulating peptic ulcer was observed in 63 patients, whereas other patients experienced chronic dull cramps. Twenty-eight patients experienced dyspepsia with anorexia and nausea, 47 patients showed weight loss, and 2 patients had gastrointestinal bleeding. In 67 of the 75 patients who underwent gastric radiological examination, an abnormal pattern was detected showing thick longitudinal folds present in the stomach but not in the antrum, as well as erosive polypoid lesions. Endoscopy showed large folds in the stomach in all patients and extension of the antrum in 74. Microscopic examination showed an increased length of gastric pits, a marked increase of IgE cells, and an eightfold increase in immunocytes per mucosal tissue unit in the fundus and the antrum. Symptoms often appeared suddenly and persisted 1-3 months with quiescent periods of 3 months to 3 yr. The evolution of DVG was followed in 52 patients for 1-5 yr: 15 healed, 28 improved, 8 were unchanged, and 1 worsened. Therapy involving sodium cromoglycate (80-160 mg/day before meals for one month) relieved the symptoms in the seven patients tested; H_2 receptor antagonists (1 g/day) were also found to be effective in the five patients tested.

6138 PROLONGED TREATMENT OF MENETRIER'S DISEASE WITH AN ORAL ANTICHOLINERGIC DRUG. (Eng.) Smith, R. L.; Powell, D. W. (Univ. North Carolina Sch. Medicine, Chapel Hill, NC 27514). *Gastroenterology* 74(5, Part 1):903-906; 1978.

Long-term, high-dose, p.o. anticholinergic drug therapy with propantheline bromide (15 mg/every meal and 30 mg at bedtime, increased over 1 month to 105 mg on a divided-dose schedule maintained for 9 months) was evaluated to determine its effect on gastric plasma protein shedding in a patient with Menetrier's disease. Serial measurements of serum protein components were performed before, during, and after long-term treatment with propantheline bromide. Total serum protein concentration increased significantly ($p<0.02$) during the treatment period from 4.3 ± 0.25 to 5.9 ± 0.55 g/dl during treatment, while albumin increased from a pretreatment value of 2.5 ± 0.12 to 3.4 ± 0.16 g/dl ($p<0.005$). The peripheral edema resolved after 2 months of therapy. The only side-effects were dryness of the mouth and mild urinary symptoms. The improvement in serum protein levels and in symptoms (epigastric tenderness and gnawing epigastric discomfort) continued after therapy was stopped; the serum protein and albumin levels have remained at treatment levels for 6 months. Intensive anticholinergic drug therapy should be tried in this disease before resorting to gastrectomy.

6139 "FOLATE-LOSING GASTROPATHY" AND INTESTINAL FOLATE ABSORPTION IN PATIENTS WITH MENETRIER'S DISEASE (GIANT HYPERTROPHIC GASTRITIS). (Eng.) Belaiche, J.; Matuchansky, C.; Zittoun, J.; Rambaud, J. C.; Bernier, J. J.; Cattan, D. (Hopital de Villeneuve-Saint-Georges, Creteil, France). *Am. J. Dig. Dis.* 23(2):143-147; 1978.

The finding of a decreased serum folate concentration in four patients with Menetrier's disease (MD) led to an investigation of folic acid loss into the gastric lumen concurrently with the intestinal absorption of folate. In each case, there was an increased gastric clearance of plasma proteins, as demonstrated by ^{51}Cr-labeled albumin tests. All the patients had a low serum level of folate and a flat curve of serum folate concentrations after an oral load of folic acid. The gastric loss of folate was determined in the patients and in five controls from the folate concentrations (before and after an i.v. injection of folinic acid) in basal and histamine-stimulated gastric secretion. A significant increase in concentrations and outputs of folate in gastric juice was observed in MD patients compared to controls ($p<0.001$), before as well as after gastric stimulation. None of the patients had abnormalities in jejunal morphology or in xylose absorption. This study shows that folic acid should be added to the list of serum components that may be lost in excess into the gastric lumen in MD patients. The responsibility of this "folate-losing gastropathy" in the folate deficiency that may be observed in MD patients has to be discussed in relation to associated abnormalities in small intestinal folate transport.

6140 GASTRIC MUCOSAL PERMEABILITY AND GASTRIC ACID SECRETION BEFORE AND AFTER HEMODIALYSIS IN PATIENTS WITH CHRONIC RENAL FAILURE. (Eng.) Shapira, N.; Skillman, J. J.; Steinman, T. I.; Silen, W. (Harvard Medical Sch., Boston, MA). *Surgery* 83(5):528-535; 1978.

Gastric mucosal permeability and gastric acid secretion were assessed in 16 patients in chronic renal failure before and after maintenance hemodialysis and in 13 normal healthy subjects by the acid-free lithium-polyethylene glycol technique. Half of the uremic patients had increased gastric mucosal permeability (IGMP) before dialysis in comparison with the normal control subjects ($p<0.001$). A significant improvement in gastric mucosal permeability ($\Delta[Li^+/PEG]$) occurred in the IGMP group after dialysis ($p<0.025$). Decreases in systolic ood pressure during hemodialysis were correlated ch increases in gastric mucosal permeability =0.72, $p<0.01$). Gastric acid secretion ($\Delta[H^+/PEG]$) s significantly lower ($p<0.001$) in the uremic ients than in normal subjects, but was increased ward normal levels after dialysis. There was a near correlation between changes in gastric acid cretion and the secretion of pepsin (Δ[pepsin/PEG]) uremic patients before and after hemodialysis =0.77, $p<0.001$). Serum gastrin concentrations re markedly elevated in uremic patients (608 ± and 331 ± 137 pg/ml in patients with normal and creased mucosal permeability, resp.) and were affected by dialysis. It is possible that the nstellation of high serum gastrin levels, abnormal stric mucosal permeability, and restoration of stric acid secretion toward more normal levels ter dialysis in patients with chronic uremia are lated to the increased incidence of gastroduodenal ceration that has been reported to occur in ese patients.

1 ALKALINE GASTROESOPHAGEAL REFLUX. (Eng.)

Pellegrini, C. A.; DeMeester, T. R.; Wern- J. A.; Johnson, L. F.; Skinner, D. B. (Univ. cago Pritzker Sch. Medicine, 950 E. 59th St., cago, IL 60637). *Am. J. Surg.* 135(2):177-184; 8.

determine the significance of alkaline secretions the development of reflux esophagitis, the re- ionship between acid and alkaline reflux was died in patients with symptoms of reflux and con- ls, using 24-hr pH monitoring of the distal esoph- s. The upper level of physiologic reflux was de- mined from the percentage of time and the number episodes during which the pH was <4 or >7 and the n duration of each episode in 15 asymptomatic jects. One hundred patients with symptoms of troesophageal reflux were divided into four groups the basis of 24-hr pH monitoring: those with ab- mal acid but normal alkaline reflux (termed acid luxers, 51 patients), those with both abnormal d and alkaline reflux (termed acid-alkaline re- xers, 25), those with normal acid and abnormal aline reflux (termed alkaline refluxers, 6), and se with both normal acid and alkaline reflux rmed nonrefluxers, 18). Nonrefluxers had a simi- incidence of heartburn, regurgitation, and dys- gia as did acid and acid-alkaline refluxers, ving the inaccuracy of symptoms for detecting lux. Alkaline refluxers had a lesser incidence heartburn but a greater incidence of regurgita- n, and four alkaline reflux patients presented h severe pulmonary disease secondary to aspiration. ilar incidence and degree of esophagitis was seen acid, acid-alkaline, and alkaline refluxers. All ee groups of symptomatic refluxers had a mean tal esophageal sphincter pressure (DESP) sig- icantly lower than that of the controls ($p<0.02$). re was no difference in the DESP between controls symptomatic nonrefluxers. Nine patients with d-alkaline reflux and one patient with alkaline lux underwent an antireflux procedure and were tudied 3 months postoperatively. All 10 patients a 24-hr pH acid score within normal limits, but had an abnormal 24-hr pH alkaline score. In both patients, reflux was demonstrated after placing an acid load in the stomach. It is concluded that symptomatic gastroesophageal reflux in patients with an intact gastrointestinal tract is a mixture of both acid and alkaline secretions, with one or both being abnormal due to different degrees of acid production and pyloric regurgitation. Patients with alkaline reflux may develop serious complications of reflux in the absence of typical symptoms of heartburn. Twenty-four hour pH monitoring of the esophagus is useful in the identification of these patients and in evaluating the ability of an antireflux procedure to control both abnormal acid and alkaline reflux.

6142 SERUM CARBENOXOLONE IN PATIENTS WITH GASTRIC AND DUODENAL ULCER: ABSORPTION, EFFICACY AND SIDE EFFECTS. (Eng.)

Baron, J. H.; Gribble, R. J. N.; Rhodes, C.; Wright, P. A. (Hammersmith Hosp., London W12 OHS, England). *Gut* 19 (4):330-335; 1978.

The absorption of carbenoxolone sodium was studied in 15 patients with gastric ulcer and 8 patients with duodenal ulcer treated for four weeks, and the results were correlated with clinical, endoscopic, and metabolic responses. The gastric ulcer patients were treated with Biogastrone: 9/15 received 100 mg on day 1 and 100 mg 3 times/day on days 2-28 and 6/15 received 100 mg on day 1, 100 mg 3 times/day on days 2-7, and 50 mg 3 times/day on days 8-28. The duodenal ulcer patients were treated with Duogastrone (50 mg on day 1 and 50 mg 4 times/day on days 2-28). Blood levels of carbenoxolone showed a log distribution, varied markedly between patients, and were markedly higher after Biogastrone tablets than after Duogastrone capsules. Serum carbenoxolone levels were similar in patients taking Biogastrone tablets before or after meals, and in patients taking Biogastrone tablets or Duogastrone capsules with or without antacids following chronic administration. Serum carbenoxolone levels were similar in patients whose gastric ulcers had or had not healed after 4 weeks of treatment. Serum carbenoxolone was significantly higher in patients who developed edema ($p<0.04$-0.06) and was significantly correlated with age ($r=0.57$, $p<0.03$) and with fall in plasma potassium ($r=0.69$, $p<0.0005$). Carbenoxolone may exert its metabolic effects systemically but its ulcer-healing effects topically; additional studies are needed to test this hypothesis.

6143 CIMETIDINE AND PLACEBO IN THE TREATMENT OF BENIGN GASTRIC ULCER: A MULTICENTER DOUBLE BLIND STUDY. (Eng.)

Dyck, W. P.; Belsito, A.; Fleshler, B.; Liebermann, T. R.; Dickinson, P. B.; Wood, J. M. (Scott and White Memorial Hosp., Temple, TX). *Gastroenterology* 74(2):410-415; 1978.

A randomized, prospective, multicenter trial of the effects of cimetidine on benign gastric ulcer was conducted in 60 out-patients. Healing was assessed endoscopically. Although none of the differences was statistically significant, mean healing rates were higher and mean decreases in ulcer size were greater with cimetidine than they were with placebo.

Twenty-four percent of the ulcers healed completely in 2 weeks when cimetidine (300 mg 4 times/day) was administered, compared with a placebo healing rate of 14%. At 6 weeks, the incidence of healing increased to 60% in the cimetidine group and 41% in the placebo group. The mean percentage of decrease in ulcer size was greater at both 2 and 6 weeks in the cimetidine group than it was in the placebo group. In both the cimetidine and placebo groups, relatively liberal intake of a potent antacid occurred, despite recommendations that antacid be taken only for ulcer pain and despite a reported low frequency of ulcer pain throughout the study. The role of potent antacids in treatment of gastric ulcers has not been defined definitively. Thus, a possible beneficial effect of cimetidine may have been obscured. For a more clear discrimination between the effects of cimetidine and placebo in the healing of gastric ulcer, studies utilizing either no antacid or antacids of low neutralizing capacity will be needed.

6144 CIMETIDINE, ANTACID, AND HOSPITALIZATION IN THE TREATMENT OF BENIGN GASTRIC ULCER: A MULTICENTER DOUBLE BLIND STUDY. (Eng.) Englert, E., Jr.; Freston, J. W.; Graham, D. Y.; Finkelstein, W.; Kruss, D. M.; Priest, R. J.; *et al.* (Veterans Admin. Hosp., 500 Foothill Drive, Salt Lake City, UT 84148). *Gastroenterology* 74(2, Part 2):416-425; 1978.

A controlled clinical trial was carried out in 206 patients with benign gastric ulcer to assess the effect on healing of cimetidine, antacids, and hospitalization. In-patients and out-patients were randomly assigned to one of three treatments: cimetidine plus antacid, cimetidine plus dummy antacid, or placebo tablet plus antacid. Ulcer healing as shown by endoscopy occurred by 12 days in 11-26% and by 42 days in 58-76% of the patients. There were no significant differences in healing between hospitalized and nonhospitalized patients or between treatment subgroups. Symptomatic response was equivalent in all groups. The median antacid consumption was 328 mEq of *in vitro* buffering capacity daily. Patients taking antacids experienced significant ($p<0.01$) diarrhea compared with those taking no antacid. This investigation suggests that the effect of cimetidine is equivalent to that of large amounts of antacid, but because a true placebo group was not studied, it is not possible to conclude from this study alone whether either agent influenced healing. In contrast to widespread belief, initiation of treatment in the hospital did not enhance healing, but because patients were not randomly assigned to inpatient and outpatient status, no final conclusion about the effect of hospitalization on healing can be drawn.

6145 ROUTINE TOTAL GASTRECTOMY FOR OPERABLE GASTRIC CANCER [Abstract]. (Eng./Ger.) Pichlmayr, R.; van Alste, H. E. (Medizinische Hochschule Hannover, Karl-Wiechert-Allee 9, D-3000 Hannover, W. Germany). *Langenbecks Arch. Chir.* 345:595; 1977.

6146 REASONS FOR POOR PROGNOSIS OF GASTRIC STUMP CARCINOMA IN COMPARISON TO PRIMARY STOMACH CARCINOMA [Abstract]. (Eng./Ger.) Radomsky, J.; Wacha, H.; Luders, L. (Krankenhaus Nordwes Steinbacher Hohl 2/26, D-6000 Frankfurt 90, W. Germany). *Langenbecks Arch. Chir.* 345:597; 1977.

6147 ESOPHAGITIS AND ESOPHAGEAL STRICTURE AFTE TOTAL GASTRECTOMY [Abstract]. (Eng./Ger. Turunen, M.; Hakkiluoto, A.; Kalima, T. (II. Chirurgische Universitats-Klinik, Helsinki, Finland). *Langenbecks Arch. Chir.* 345:596; 1977.

6148 NEW DIAGNOSTIC AND THERAPEUTIC ASPECTS IN TREATMENT OF SARCOMATOUS LESIONS OF TH STOMACH [Abstract]. (Eng./Ger.) Merkle, P.; Bultmann, B.; v. Gierke, S.; Schlag, P. (Abt. f. Chirurgie, Universitat Ulm, Steinhovelstr. 9, D-7900 Ulm-Safranberg, W. Germany). *Langenbecks Arch. Chir.* 345:598; 1977.

6149 MALIGNANT NONCARCINOMATOUS TUMORS OF THE STOMACH [Abstract]. (Eng./Ger.) Mannl, H. F. K.; Simonis, G.; Felsing, H. H.; Lindemann, M. (Chirurgische Universitatsklinik, D-6650 Hombur Saar, W. Germany). *Langenbecks Arch. Chir.* 345:597-598; 1977.

6150 GASTRIC ACID SECRETION CAPACITY BEFORE, AT 3 MONTHS AND AT 1 YEAR FOLLOWING PARIETAL CELL VAGOTOMY AND SELECTIVE GASTRIC VAGOTOMY [Abstract]. (Eng.) Ornsholt, J.; Parmeggiani, A.; Andersen, D.; Amdrup, E. (Kommunehospitalet, Aarhus, Denmark). *Scand. J. Gastroenterol.* 12(Suppl. 45):115; 1977.

6151 GLANDULAR CYSTS OF GASTRIC MUCOSA [Abstract]. (Eng.) Krentz, K.; Gohrband, G. (Luisenhospital, Aachen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):487; 1977.

6152 EFFECT OF PHENFORMIN ON PROVOKED DUMPING IN MAN [Abstract]. (Eng.) Humphreys, W. G.; Parks, T. G.; Buchanan, K. D.; Love, A. H. G. (Dept. Surgery, Queen's Univ., Belfast, Northern Ireland). *Gut* 18(11):A956; 1977.

6153 POSTVAGOTOMY DIARRHOEA AND DUMPING TREATE WITH RECONSTRUCTION OF THE PYLORUS [Abstract]. (Eng.) Johansen, T. S.; Frederiksen, H. J.; Christiansen, P. M. (Hvidovre Hosp., Denmark). *Scand. J. Gastroenterol.* 12(Suppl. 45):41; 1977.

6154 SERUM PEPSINOGEN I AS A SCREENING TEST FO PERNICIOUS ANEMIA AND PERNICIOUS ANEMIA STATES [Abstract]. (Eng.) Siurala, M.; Samloff, I. M.; Varis, K.; Ihamaki, T. (Meilahti Hosp., Helsinki, Finland). *Scand. J. Gastroenterol.* 12 (Suppl. 45):98; 1977.

155 FAMILY CHARACTERISTICS OF PERNICIOUS ANEMIA [Abstract]. (Eng.) Varis, K.; Ihamaki, .; Isokoski, M.; Sipponen, P.; Kekki, M.; Lehtola, .; Siurala, M. (Meilahti Hosp., Helsinki, Finland). *cand. J. Gastroenterol.* 12(Suppl. 45):108; 1977.

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6097, 6100, 6102, 6103, 6108, 6113, 6115,
6116, 6117, 6120, 6121, 6122, 6123, 6124,
6125, 6127, 6129, 6200, 6204, 6206, 6207,
6212, 6226, 6364, 6392, 6458, 6497, 6506,
6508, 6509, 6510, 6512, 6518, 6524, 6525,
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STOMACH

Peptic Ulcers

9 MEASUREMENT OF GASTRIC MUCOSAL BLOOD FLOW IN MAN. (Eng.) Guth, P. H.; Baumann, H.; ssman, M. I.; Aures, D.; Elashoff, J. (691/111C erans Admin. Wadsworth Hosp. Center, Wilshire Sawtelle Blvd., Los Angeles, CA 90073). *Gas-enterology* 74(5, Part 1):831-834; 1978.

determine whether the ^{14}C-aminopyrine (AP) clear-e technique can be used to measure gastric mu-al blood flow in man and, if so, whether the io of blood flow to acid secretion is different duodenal ulcer (DU) patients than in normal sub-ts, the clearance of ^{14}C-AP from plasma into gas-c juice was studied in five normal men and five with duodenal ulcer during the infusion of step-e increasing doses of pentagastrin (25-2,000 ng/ hr). Acid secretion in response to high doses of tagastrin (222, 666, and 2,000 ng/kg/hr) was sig-icantly greater ($p<0.05$) in DU patients than in mal subjects. For each dose of pentagastrin, the -AP clearance rate increased in both normal and subjects, and its mean rate of clearance was al-s greater in DU subjects, though the difference not statistically significant. There was a sig-icant correlation between rate of acid secretion clearance of ^{14}C-AP in both the normal subjects ($r=0.76$) and the DU patients ($r=0.71$), and the slopes and intercepts of the lines relating these two variables did not differ significantly between the two groups. Similarly, R, the ratio of gastric juice to plasma AP concentrations, which is also a measure of the milliliters of blood flow for each milliliter of juice secreted, showed a negative correlation with rate of acid secretion in both DU patients and normal subjects, and the slopes and intercepts of the lines relating R to acid secretion did not differ significantly between the two groups. The relation between acid secretion and clearance of ^{14}C-AP in man is similar to that found in earlier studies in dog, a species in which clearance of AP has been shown to be a valid measure of mucosal blood flow. It is concluded that clearance of ^{14}C-AP from plasma into gastric juice appears to be a valid measure of mucosal blood flow in man and that the relationship between rate of acid secretion and clearance of ^{14}C-AP is similar in normal subjects and in patients with DU.

6200 EFFECT OF BILE ACIDS AND pH ON THE RELEASE OF ENTEROPEPTIDASE IN MAN. (Eng.) Rinderknecht, H.; Nagaraja, M. R.; Adham, N. F. (Veterans Admin. Hosp., Sepulveda, CA 91343). *Am. J. Dig. Dis.* 23(4):332-336; 1978.

Because bile acids increase the release of the human brush border enzymes enteropeptidase (EP), alkaline phosphatase (AP), and leucine aminopeptidase (LAP) from duodenal mucosa and because the action of bile acids is independent of their known enhancing effect on enteropeptidase activity, the effects of glycodeoxycholate and pH on the release of these three enzymes was studied in human duodenal biopsies to clarify the kinetics of the release. Glycodeoxycholate (2.5 mM) enhanced the release of both EP and AP (expressed as percent total enzyme/g wet tissue) at both pH 6.3 and pH 8.2 ($p<0.001$ and $p<0.004$ for EP and AP, resp., at pH 6.3; $p<0.002$ for both EP and AP at pH 8.2). However, both EP and AP were released to a greater extent at pH 8.2 than at pH 6.3 in the absence of bile acid (15.4 ± 2.8% at pH 6.3 versus 36.2 ± 6.3% at pH 8.2, $p<0.005$, for EP; 5.2 ± 0.7% at pH 6.3 versus 14.4 ± 3.4%, $p<0.005$ for AP), the enhancement being comparable to that produced by glycodeoxycholate on either enzyme at either pH. Contrary to some results obtained with animal tissue by other investigators, these experiments with human duodenal mucosa indicate that EP, under all conditions tested, is released at a rate considerably greater than that for AP or LAP. The looser association of EP with cellular components relative to that of other brush border enzymes, as indicated by the observations, may be related to the unique function of EP as the trigger enzyme of protein digestion. The pH of duodenal juice is a hitherto unrecognized factor in the release mechanism of brush border enzymes.

6201 INTESTINAL PHASE OF GASTRIC SECRETION IN PATIENTS WITH DUODENAL ULCER. (Eng.) Konturek, S. J.; Kwiecien, N.; Obtulowicz, W.; Sito, E.; Oleksy, J. (Inst. Physiology, 16 Grzegorzecka St., 31-531 Krakow, Poland). *Gut* 19(4):321-326; 1978.

Studies were carried out to establish the existence of the intestinal phase of gastric secretion in man and to compare it in healthy subjects and duodenal ulcer patients. In 10 healthy subjects and 10 duodenal ulcer patients, the intestinal phase of gastric acid secretion was studied by intraduodenal infusion of a 10% liver extract meal (pH 7) at 400 ml/hr for 3 hr. A gastroduodenal double-lumen tube with two balloons was used to block the pylorus and to prevent duodenogastric reflux. Gastric acid response to a duodenal meal of liver extract reached a peak at the end of the first hour of infusion of the extract and was then followed by a relatively well-sustained plateau. When the figure was normalized as a percentage of peak response to pentagastrin, it was about 45% in healthy subjects and 63% ($p<0.05$) in duodenal ulcer patients. Serum gastrin concentration increased significantly ($p<0.05$) during a duodenal meal of liver extract only in duodenal ulcer patients and not in healthy subjects. The combination of the duodenal meal of liver extract with pentagastrin infusion resulted in a significantly greater ($p<0.05$) increase in acid output i duodenal ulcer patients than in healthy controls. Duodenal perfusion with a liver extract meal in which the pH was gradually decreased caused a pH-dependent reduction in acid output, but not in serum gastrin, both in the duodenal ulcer patient and in healthy subjects. This study shows that th intestinal phase in man results in a potent gastri acid stimulation that is pH-dependent, greatly augmented by pentagastrin, and more vigorous in duodenal ulcer patients than in healthy controls.

6202 GIANT DUODENAL ULCERS. (Eng.) Eisenbe R. L.; Margulis, A. R.; Moss, A. A. (Ve erans Admin. Hosp., 4150 Clement St., San Francis CA 94121). *Gastrointest. Radiol.* 2(4):347-353; 1978.

To improve the diagnosis of and reduce the mortal from giant duodenal ulcers, clinical, radiologica and therapeutic results from 26 patients with gia duodenal ulcers are reviewed. The concept of the ulcer/bulb ratio (ratio of longest diameter of th ulcer to that of the total bulb including the ulc is introduced. In all cases this ratio was 0.8 o greater; in 18 cases, the ulcer completely replac the duodenal bulb. An "ulcer within an ulcer" appearance, representing a small area of deeper ulc ation within the giant ulcer, was noted in 8 case Half of the patients have remained symptom-free o medical therapy alone. Only two patients in the series died of complications of giant duodenal ulcer (one of hypovolemic shock 6 weeks postoperatively, one of massive hemorrhage shortly after admission). Five of the six patients requiring surgical intervention did well after surgery. It is suggested that a course of intensive medical therapy be attempted prior to surgical interventi

6203 PROPHYLACTIC EFFECT OF CIMETIDINE IN DU DENAL ULCER DISEASE. (Eng.) Gudmand-H er, E.; Jensen, K. B.; Krag, E.; Rask-Madsen, J.; Rahbek, I.; Rune, S. J.; *et al.* (Herlev Univ. Hos 2730 Herlev, Denmark). *Br. Med. J.* 1(6120):1095-1097; 1978.

Fifty-seven symptom-free patients with duodenal u entered a double-blind trial to assess the prophylactic effect of cimetidine. Patients were rando allocated to receive cimetidine (400 mg b.i.d., 29 patients) or placebo (28 patients). The trial was designed to imitate daily clinical practice, duodenal ulcer disease was diagnosed by means of x-ray examination. Three patients from each grou withdrew from the trial. All remaining patients continued to receive treatment for 12 months or u til symptoms recurred. Three of 28 patients suffered relapses during cimetidine treatment, compa with 20 of 25 receiving placebo. No side-effects were attributable to cimetidine. Long-term cimet dine treatment had no curative effect as relapses occurred soon after treatment was stopped. The estimated chance (cumulative remission rate ±2 SE of remaining symptom-free for 13 weeks after 1 yr of cimetidine treatment was 47 ± 21%. Maintenanc treatment with cimetidine is a suitable alternati elective surgery in patients with duodenal ulcer ject to frequent relapses. Further study is ded to establish the optimal duration and safety prolonged cimetidine treatment.

4 SECRETION OF INTRINSIC FACTOR AND HYDROCHLORIC ACID AFTER 12 WEEKS' TREATMENT H CIMETIDINE. (Eng.) Epstein, O.; Judelman, J.; an, G.; Ardeman, S. (Royal Free Hosp., London, land). *Gut* 19(4):327-329; 1978.

effect of cimetidine on intrinsic factor and production was studied in patients undergoing atment for 12 weeks. A sample of 16 patients pentagastrin stimulation studies performed bee starting the 12-week course of cimetidine, and in 12 hr after completing the course. Basal pentagastrin-stimulated intrinsic factor setion was assayed in 13 patients. There was no nificant difference in the pattern of secretion er 12 weeks of cimetidine treatment. The al and peak acid outputs of all 16 patients were sured. No significant difference was found in pattern of acid secretion after treatment. It ears that parietal cell secretory function is tored to normal within 12 hr of discontinuing a longed course of cimetidine.

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PROTEOLYTIC ACTIVITY OF GASTRIC JUICE IN PEPTIC ULCER AND CHRONIC GASTRITIS--POSLITY OF ITS PHARMACOLOGICAL CORRECTION. (Rus.) merman, Ia. S. (Dept. Therapy, Perm Medical ., Perm, USSR). *Klin. Med. (Mosk.)* 54(7):63-68; .

) PROPHYLACTIC TREATMENT OF PEPTIC ULCER. (Rus.) Samson, E. I. (Dept. Therapy, Chernovtsy Medical Inst., Chernovtsy, USSR). *Klin. Med. (Mosk.)* 45(10):112-116; 1977.

6211 EFFECT OF VARIOUS MIXTURES OF ANTICHOLINERGIC DRUGS ON THE FUNCTIONAL STATUS OF THE CIRCULATORY SYSTEM IN PEPTIC ULCER PATIENTS. (Rus.) Ivanova, E. A. (Dept. Therapy, Kiev Medical Inst., Kiev, USSR). *Vrach. Delo* (10):108-111; 1977.

6212 CIMETIDINE: THERAPEUTIC PROSPECTS OF HISTAMINE H_2-RECEPTOR INHIBITORS. (Fre.) Bonfils, S.; Rene, E. (INSERM U-10, Hopital Bichat, 170, boulevard Ney, 75877 Paris Cedex 18, France). *Rev. Prat.* 27(36):2321-2322; 1977.

6213 FACTS ON THE THERAPEUTIC EFFECTIVENESS OF CIMETIDINE IN PEPTIC ULCER TREATMENT. (Ger.) Malchow, H.; Sewing, K. F. (Medizinische Universitatsklinik, Otfried-Muller-Str. 10, D-7400 Tubingen, W. Germany). *Internist (Berlin)* 18(12): 650-656; 1977.

6214 CIMETIDINE THERAPY OF DUODENAL ULCER. (Ger.) Pelloni, S.; Koelz, H. R.; Blum, A. L. (Stadtspital Triemli, CH-8063 Zurich, Switzerland). *Z. Gastroenterol.* 15(10):624; 1977.

6215 ENDOSCOPIC FOLLOW-UP DUODENAL ULCER FOLLOWING FOUR WEEKS OF CIMETIDINE TREATMENT. (Ger.) Molinari, F.; Turello, V.; Giacosa, A.; Ciancamerla, G.; Cheli, R. (Ospedali Civili di Genova, Genova, Italy). *Z. Gastroenterol.* 15(10): 622-624; 1977.

6216 DIMECOUMARONE--A NEW ANTI-ULCER DRUG. (Rus.) Mirzoian, S. A.; Nazaretian, R. A. (Dept. Pharmacology, Erevan Medical Inst., Erevan, USSR). *Zh. Eksp. Klin. Med.* 17(4):3-10; 1977.

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6218 VITAMIN SUPPLY OF PEPTIC ULCER PATIENTS. (Rus.) Ivancho, E. S.; Sabov, V. A.; Shchetka, M. P.; Primich, E. I. (Zakarpat'e Oblast Public Health and Epidemiology Station, Uzhgorod, USSR). *Vrach. Delo* (7):70-71; 1977.

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6219 IN VIVO METABOLISM OF PLASMA FREE FATTY ACIDS BY INTESTINAL MUCOSA OF MAN. (Eng.)

Gangl, A.; Renner, F. (II. Universitatsklinik fur Gastroenterologie und Hepatologie, Garnisongasse 13, A-1090 Vienna, Austria). *Gastroenterology* 74(5): 847-850; 1978.

Because the free fatty acid (FFA) supply to the intestinal mucosa has two sources (the gut lumen and the plasma pool) and because the FFA from these sources have different metabolic fates, the metabolism of plasma FFA was studied in the mucosa of the upper jejunum in 12 patients *in vivo*. After rapid i.v. injection of ^{14}C-palmitic acid complexed to human albumin, serial jejunal biopsies were performed with a hydraulic biopsy tube. Specimens of jejunal mucosa were homogenized and assayed for lipids and radioactivity. The mean half-time of initial ^{14}C-FFA disappearance from plasma was 2.0 min. Uptake of ^{14}C-plasma FFA by the mucosa of the entire small bowel was estimated as 0.7%. Of mucosal radioactivity, 25.2% was recovered in water-soluble metabolites, suggesting local oxidation of plasma FFA; 31.7% was incorporated into phospholipids, 16.5% into triglycerides, and 9.7% was esterified with cholesterol. The specific activity of mucosal triglyceride-fatty acids was about 10-fold higher than the specific activity of serum triglyceride-fatty acids during the first 15 min after the i.v. injection of ^{14}C-palmitate, thereby establishing for the first time in man *in situ* esterification of plasma FFA by intestinal mucosa. It is therefore concluded that in man, plasma FFA also serve as a constantly available source of energy and of precursors for more complex lipids in the absorptive intestinal epithelium. It is speculated that, as in rats, part of the ester lipid synthesized *in situ* from plasma FFA may subsequently leave the absorptive cells incorporated in lipoproteins. Quantitatively this pathway must be minute, however, under normal conditions.

6220 PRIMARY MALIGNANT TUMORS OF THE SMALL INTESTINE. A TWENTY-TWO YEAR EXPERIENCE WITH THIRTY PATIENTS. (Eng.)

Sager, G. F. (7 Bramhall St., Portland, ME 04102). *Am. J. Surg.* 135(4):601-603; 1978.

A review of 30 cases of primary malignant small bowel tumors is presented. Chronic obstruction was the presenting symptom most frequently encountered (13 patients), with an acute abdomen from perforation of the tumor next in frequency (6 patients). Adenocarcinoma (14 patients) and carcinoid (12 patients) were the most frequent findings, and more than half of all tumors (16/30) were found in the ileum. Five of 30 patients survived: 3 are alive and well and 2 are alive on chemotherapy. Five of these died of other causes. Of 27 patients explored for symptomatic small bowel cancers, only 1 is alive free of tumor. Malignant small bowel tumors are difficult to diagnose early and have a poor prognosis.

6221 PRIMARY LYMPHOMAS OF THE GASTROINTESTINAL TRACT. I. PLASMA CELL TUMOURS. (Eng.)

Henry, K.; Farrer-Brown, G. (Westminster Medical Sch., London, England). *Histopathology* 1(1):53-76; 1977.

The histology of 125 cases of primary gastrointestinal lymphomas arising in the stomach and small an large intestines is reviewed. The material was gathered from the Bland-Sutton Institute of Pathology at the Middlesex Hospital and from the Westminster Hospital. Of the initial total of 143 cases diagnosed, 18 were rejected. Of the acceptable 125 cases, 51 lymphomas arose in the stomach, 53 in the small intestine, and 21 in the large intestine including the rectum. Excluding the four children in the series, ages ranged from 18 to 82 and were fairly evenly distributed across the decades. There was no significant sex difference in the Middlesex Hospital cases, but in the Westminster Hospital series, the male to female ratio was approximately 2.6 to 1. One significant finding to emerge from this histological survey, and that forms the basis of this communication, is the proportion of lymphomas considered to be predominantly of plasma cell type. These plasma cell tumors, or extramedullary plasmacytomas, accounted for 49 of the 125 cases of gastrointestinal lymphomas. They were less common in the stomach and most common in the intestine, the majority occurring in the ileocecal region. Conversely, Hodgkin's disease, in contrast to some series, was not encountered. Of the non-Hodgkin's lymphomas, grade I tumors were uncommon, and true histiocytic lymphomas were distinctly rare. The high incidence of plasma cell tumors in this series is in keeping with the morphological findings of a previous study carried out in patients with alpha-chain disease and in a small series of primary gastrointestinal lymphomas.

6222 "MEDITERRANEAN ABDOMINAL LYMPHOMA" OR IMMUNOPROLIFERATIVE SMALL INTESTINAL DISEASE. PART II: PATHOLOGICAL ASPECTS. (Eng.)

Nassar, V. H.; Salem, P. A.; Shahid, M. J.; Alami, S. Y.; Balikan, J. B.; Salem, A. A.; *et al.* (Grady Memorial Hosp., 80 Butler St., S.E., Atlanta, GA 30303). *Cancer* 41(4):1340-1354; 1978.

The pathology of 25 cases of Mediterranean abdomin lymphoma, better designated as immunoproliferative small intestinal disease (IPSID), that were seen a the American University of Beirut Hospital is reviewed. The series includes nine cases with documented alpha-heavy chain disease (α-HCD). IPSID i characterized by the presence of a diffuse and compact bandlike lymphoplasmacytic infiltration of th proximal small intestinal mucosa. The presence of a concomitant malignant lymphoma in the intestine and/or mesenteric lymph nodes and of alpha-heavy protein in the serum is commonly encountered. Two histopathologic variants of IPSID are present. Th first is characterized by the diffuse infiltratio of the mucosa, at sites away from tumoral masses, by either pure plasmacytic infiltration or by mixe lymphoplasmacytic infiltration. This variety is associated with the immunoblastic sarcoma type of malignant lymphoma, and with α-HCD. The second variant is characterized by a diffuse follicular lymphoid hyperplasia pattern in the small intestin

mucosa. The associated malignant lymphoma is
ffuse and undifferentiated often having a starry-
y pattern. This variety is not associated with
HCD. Both histologic variants share the same
inical antecedents. In five patients, mesenteric
mph nodes harbored immunoblastic sarcoma while
e intestinal mucosae of the same patients were
volved with a benign-appearing lymphoplasmacytic
filtration. This finding stresses the need for
aging laparotomy. Three patients, with α-HCD,
d peripheral lymph node involvement with immuno-
astic sarcoma. The disease apparently evolves
two stages: an immunoproliferative phase, prob-
ly reversible, and a later development of malig-
nt lymphoma. The term IPSID accurately describes
e nature of the entity.

23 EOSINOPHILIC ILEITIS. (Fre.) Germain, M.;
Lemaigre, G.; Lapierre, J.; Lenriot, J.
entre Hospitalier de Longjumeau, 91160 Longjumeau,
ance). *J. Chir. (Paris)* 114(5):377-384; 1977.

sinophilic ileitis, found almost exclusively in
e coastal areas of Japan, Brittany, and the
therlands, has long been attributed to infesta-
ons with ascarids, *Anisakis* or *Eustoma rotundatum*
rvae (the latter two parasitic larvae are ac-
ired by eating raw fish). A case of possibly
nparasitic eosinophilic ileitis in a 17-yr-old
y is discussed. As in the majority of cases,
mptoms mimicking appendicitis led to a surgical
tervention that revealed two 10-cm segments of
ickened, discolored ileum. A segmental resection
s performed. The patient had a marked eosino-
ilia (11% of WBC). Antibody titers to *Toxocara*
nis were borderline positive, but no parasites
uld be found in the stools or lesions. Recovery
s uneventful. Histologically, the eosinophilic
anulomas are easily identified by the character-
tic eosinophilic infiltration. Clinical diag-
sis is difficult, but the disease may be sus-
cted in patients with a history of allergies,
ving appendicitis-like symptoms and eosinophilia
eater than 10% of WBC. Medical treatment (piper-
ine, delta-cortisone) may be attempted in non-
gent cases. There is often a tendency towards
ontaneous regression of the ileitis. In all
ses the diagnosis can only be confirmed by histo-
gic examination.

24 ALTERATIONS IN INTESTINAL STRUCTURE, FAT
ABSORPTION AND BODY WEIGHT AFTER INTES-
NAL BYPASS FOR MORBID OBESITY. (Eng.) Friedman,
I.; Chandler, J. G.; Peck, C. C.; Nemeth, T. J.;
um, S. K. (Letterman Army Inst. Res., Presidio
n Francisco, San Francisco, CA). *Surg. Gynecol.*
stet. 146(5):757-767; 1978.

document the morphologic alterations in the
all intestine after intestinal bypass, 11 pa-
ents who underwent jejunoileal bypass for morbid
esity were studied. Serial intestinal biopsies
re obtained prior to and at timed intervals fol-
wing operation in both fasted and fat-fed states.
llus height increased asymptotically, reaching
plateau at 80% in excess of the preoperative
value (0.42 ± 0.08 mm) after operation. Fat ingestion did not affect villus height. The postbypass body weight reached a plateau at 63.9 ± 11.1% of initial body weight over a 16-month period and correlated linearly ($r=-0.97$, $p<0.1$) with villus height following an asymptotic curvilinear course. The time required to attain 90% of total body weight loss was 15.9 months. A study of intestinal fat absorption at both the light microscopic and ultrastructural levels showed that the enlarged villi were lined along the entire villus by functionally mature epithelium capable of transporting lipid. The normal pattern of intracellular lipid accumulation remained constant preoperatively and postoperatively. Villus hypertrophy is an important mechanism in the plateauing of weight loss after jejunoileal bypass for morbid obesity.

6225 THE PREVENTION OF BYPASS ENTERITIS AFTER JEJUNOILEAL BYPASS FOR MORBID OBESITY. (Eng.) Hubbard, T. B., Jr. (Mercy Hosp., 301 St. Paul Pl., Baltimore, MD 21202). *Ann. Surg.* 187(5): 502-509; 1978.

A preliminary report of efforts to devise a valve to prevent reflux into the bypassed intestine after jejunoileal bypass is presented. Valve I (42 cases) was formed by dividing the ileum, everting the proximal end as one matures an ileostomy, and inserting this into the distal ileum. Only 12 of these valves were competent. Valve II (6 cases) was formed by dividing the ileum and merely inserting the proximal bowel into the distal, allowing it to evert spontaneously as with an unmatured ileostomy. In two cases, the valve was competent, but four cases became obstructed and this valve is mentioned only to be condemned. Valve III (19 cases) is similar to an isoperistaltic Kock valve, except that the intussuscepted ileum is first divested of its mesentery. All such valves have been competent. All 33 patients with a competent valve have been free of the stigmata of bypass enteritis, whereas 54% of 156 patients showed the symptoms of enteritis after conventional jejunoileal bypass.

6226 GROWTH, HEALTH, AND DEVELOPMENT AFTER NEONATAL GUT SURGERY: A LONG-TERM FOLLOW-UP. (Eng.) Tejani, A.; Dobias, B.; Nangia, B. S.; Mahadevan, R. (Methodist Hosp., 506 Sixth St., Brooklyn, NY 11215). *Pediatrics* 61(5):685-693; 1978.

Growth and development data on 19 children who survived gut surgery in the immediate newborn period were studied to evaluate the quality of life following neonatal gut surgery. The follow-up period ranged from 7 months to 7 yr, 6 months, with a mean of 3 yr, 8 months. Neonates who underwent gut resection were at a higher risk for delay in height and weight gain compared with those who had gut surgery without resection. Six of the 12 children who had gut resection showed delay in height gain, and 7 showed delay in weight gain. Of the seven children who had gut surgery but no resection, only one showed delay in height and weight gain after the age of 1 yr. An individual approach and careful serial follow-ups are recommended for all children undergoing gut resection in the newborn period. Of the eight children who had psychometric testing in the gut-resected group, only two are normal. Three of the four older children in this group show signs of perceptuomotor defects, suggesting the need for subtesting such children at about 6 yr of age so that remedial help, if necessary, may be provided when formal schooling begins.

6227 ILEAL LOOP STENOSIS: A LATE COMPLICATION OF URINARY DIVERSION. (Eng.) Mitchell, M. E.; Yoder, I. C.; Pfister, R. C.; Daly, J.; Althausen, A. (Massachusetts General Hosp., Boston, MA 02114). *J. Urol.* 118(6):957-961; 1977.

6228 INFLAMMATORY CELL COUNT AND IDENTIFICATION IN SPECIFIC DUODENITIS (CELIAC DISEASE, WHIPPLE'S DISEASE AND CROHN'S DISEASE): COMPARISON WITH JEJUNAL FINDINGS. (Eng.) Cheli, R.; Giacosa, A. (Ospedali Civili di Genova, Genova, Italy). *Endoscopy* 9(3):147-151; 1977.

6229 HERNIA THROUGH THE FORAMEN OF WINSLOW. (Eng.) Ohkuma, R.; Miyazaki, K. (Shimonoseki Natl. Hosp., Shimonoseki, Japan). *Jpn. J. Surg.* 7(3):151-157; 1977.

6230 CURRENT STATUS OF INTESTINAL BYPASS SURGERY IN THE TREATMENT OF OBESITY. (Eng.) Bray, G. A. (Harbor General Hosp., 1000 W. Carson St., Torrance, CA 90509). *Diabetes* 26(11):1072-1079; 1977.

6231 MICROSCOPIC AND PULSE CYTOPHOTOMETRIC INVESTIGATION OF A CARCINOMA OF THE JEJUNUM IN A SEVEN YEAR OLD CHILD. (Eng.) Busing, C. M.; Haag, D.; Geiger, H.; Tschahargane, C. (Stadt. Krankenanstalten, Theodor-Kutzer-Ufer, D-6800 Mannheim, W. Germany). *Virchows Arch. [Pathol. Anat.]* 375(2):115-122; 1977.

6232 TREATMENT OF INTESTINAL FISTULAS. (Eng.) Monod-Broca, P. (Hopital de Bicetre, 94270 France). *Br. J. Surg.* 64(10):685-689; 1977.

6233 NUTRITIONAL SUPPORT OF FISTULAS. (Eng.) Holmes, J. H. (Peterborough District Hosp., Thorpe Rd., Peterborough, England). *Br. J. Surg.* 64(10):695-697; 1977.

6234 LOCAL AND SURGICAL MANAGEMENT OF ENTEROCUTANEOUS FISTULAS. (Eng.) Irving, M. (Hope Hosp., Salford, England). *Br. J. Surg.* 64(10):690-694; 1977.

6235 DUODENAL DIVERTICULUM CAUSING INTERMITTENT-PERSISTENT CHOLESTASIS: ASSOCIATED WITH PAPILLITIS CHRONICA FIBROSA. (Eng.) Manabe, T.; Yu, G. S. M. (Albert Einstein Coll. Medicine, New York, NY). *N.Y. State J. Med.* 77(13):2132-2136; 1977.

6236 REFLUX THROUGH THE SPHINCTER OF ODDI? INFLUENCE OF DUODENAL DISTENTION UPON BILIARY TRACT AND PANCREAS: EXPERIMENTAL STUDY. (Eng.) Murat, J. E. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 86-89; 1977.

6237 USE OF BARIUM DUODENOGRAPHY IN DIAGNOSIS OF TUMORS OF THE AMPULLA OF VATER. (Eng Lecomte, P.; Gavoille, H.; Breton, M.; Delmont, J. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 102-110; 1977.

6238 THE SPHINCTER OF ODDI IN MUCOSAL DIVERTICULA OF THE DUODENAL WINDOW. (Eng.) Rives, J.; Lardennois, B.; Flament, J. B. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 145-152; 1977.

6239 PARAAMPULLARY DUODENAL CYSTS: THEIR RELATIONS WITH CHRONIC PANCREATITIS. (Eng.) Martin, E. D. *In: The Sphincter of Oddi Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Ka ger): 156-162; 1977.

6240 GASTROINTESTINAL ADAPTATION FOLLOWING SMALL BOWEL BYPASS FOR OBESITY. (Eng.) Dudrick, S. J.; Daly, J. M.; Castro, G.; Akhtar, M. *In: Transactions of the Southern Surgical Association Eighty-Eighth Annual Meeting held at The Breakers, Palm Beach, Florida, December 6-8, 1976.* (Philadelphia: J. B. Lippincott Co.): 8 150-156; 1977.

6241 IS DUODENITIS A DYSPEPTIC MYTH? (Eng. Thomson, W. O.; Robertson, A. G.; Imri C. W.; Joffe, S. N.; Lee, F. D.; Blumgart, L. H. (Royal Infirmary, Glasgow, G4 OSF, Scotland). *Lancet* 1(8023):1197-1198; 1977.

6242 OBTURATOR HERNIA: AN ELUSIVE DIAGNOSI (Eng.) Kozlowski, J. M.; Beal, J. M. (Northwestern Univ. Medical Sch., 303 E. Chicago Ave., Chicago, IL 60611). *Arch. Surg.* 112(8):1C 1002; 1977.

6243 SMALL-INTESTINAL INVOLVEMENT IN FAMILI POLYPOSIS DIAGNOSED BY OPERATIVE INTES TINAL FIBERSCOPY: REPORT OF FOUR CAS (Eng.) Ohsato, K.; Yao, T.; Watanabe, H.; Iida

; Itoh, H. (Kyushu Univ. Faculty Medicine, Fu-
ka 812, Japan). *Dis. Colon Rectum* 20(5):414-
; 1977.

4 PROSTAGLANDINS AND ACUTE INTESTINAL
PSEUDO-OBSTRUCTION [Letter to Editor].
g.) Chousterman, M.; Petite, J. P.; Housset, E.;
nych, A. (Boussais Hosp., 75674 Paris, Cedex 14,
nce). *Lancet* 2(8029):138-139; 1977.

5 SMALL PARADUODENAL HERNIAS. (Eng.)
Freund, H.; Berlatzky, Y. (Hadassah Univ.
p., Jerusalem, Israel). *Arch. Surg.* 112(10):
0-1183; 1977.

6 DIAGNOSIS AND TREATMENT OF DIFFUSE ILEO-
JEJUNITIS. (Eng.) Goldstein, F.; Abram-
, J.; Messori, D. A.; Szydlowski, T.; Thornton,
J., III (Lankenau Hosp., Philadelphia, PA
51). *Am. J. Gastroenterol.* 68(5):465-469; 1977.

6247 SMALL BOWEL MELAENA: 2 CASES DIAGNOSED BY ANGIOGRAPHY. (Eng.) Forbes, W. St. C.; Nolan, D. J.; Fletcher, E. W. L.; Lee, E. (Dept. Diagnostic Radiology, Univ. Manchester, Stopford Building, Manchester M13 9PT, England). *Br. J. Surg.* 65(3):168-170; 1978.

See also, 6006, 6024, 6038, 6045, 6047, 6049, 6057, 6059, 6072, 6073, 6081, 6084, 6100, 6102, 6180, 6121, 6145, 6156, 6164, 6168, 6272, 6308, 6309, 6347, 6364, 6498, 6506, 6508, 6516, 6518, 6519, 6525, 6533, 6535, 6539, 6543, 6551, 6556, 6560, 6561.

SMALL INTESTINE

Malabsorption

8 COELIAC DISEASE IN SCHOOLCHILDREN. (Eng.)
Kalapesi, Z.; Rees, J. P. R. (Natl. Child-
's Hosp., Dublin, Ireland). *Ir. Med. J.* 71(6):
-191; 1978.

clinical picture and laboratory findings in 24
ients with celiac disease who were diagnosed
er 4 yr of age are presented. The classical
nical picture was rare; growth retardation and
mia were the most common presenting features,
rt stature being present in 17, and low hemo-
bin levels (<11 g/dl) in 20 patients. The ane-
was mainly hypochromic with low serum iron
0 μg/dl in 16/19 cases), but low serum folic
d (<2.7 ng/ml) was also a consistent finding
/19). Abdominal pain was a feature in 42% of
cases. A history of bowel habit was very un-
iable, and diarrhea was often episodic in nature.
single laboratory test seemed to be an effective
eening test for malabsorption. This fact empha-
es the importance of intestinal biopsy, particu-
ly with children presenting with retarded growth
anemia, with or without gastrointestinal symp-
s.

9 FURTHER EVIDENCE OF A PRIMARY MUCOSAL DE-
FECT IN COELIAC DISEASE. (Eng.) Cornell,
J.; Rolles, D. J. (Royal Melbourne Inst. Tech-
ogy, 124 LaTrobe St., Melbourne, Victoria, 3000,
tralia). *Gut* 19(4):253-259; 1978.

basic chemical structure of fraction 9 components of a peptic-tryptic-pancreatinic digest of wheat gliadin was analyzed for a better understanding of the toxicity of fraction 9 for celiac disease patients. Subfractions of fraction 9 were subjected to *in vitro* mucosal digestion and the filtrates were examined for residual peptides. Small intestinal mucosa from four groups of individuals were studied: eight patients with celiac disease in remission, eight healthy controls (2 adults and 6 children), nine first-degree relatives (2 adults and 7 children) of patients with celiac disease, and six children with recurrent diarrhea investigated for possible celiac disease, but in whom the diagnosis was excluded. The highest amounts of residual peptides (measured by scanning densitometer) were detected after digestion with mucosa from patients with celiac disease and the lowest amounts from the controls ($p<0.001$). The results obtained with the group of relatives fell between those of the celiac disease and control groups, while the recurrent diarrhea group overlapped the relatives and controls. The residual peptides were derived chiefly from the B-type subfractions (pH 6 eluates from SP Sephadex-C25 columns) of subfractions 1 and 2, obtained by ion-exchange chromatography of fraction 9. These subfractions are rich in glutamine/glutamic acid (45.0 and 35.7 molar% for 1B and 2B, resp.) and proline (24.0 and 19.4 molar% for 1B and 2B, resp.) and have a molecular weight (apparent) of not greater than 1,500 daltons. The results lend further support to the hypothesis of an enzyme deficiency in celiac disease. A partial enzyme deficiency may exist in some first-degree relatives and in some children with recurrent diarrhea but with histology of the small intestine within normal limits. Human lymphocyte antigen (HLA)-B8 was found not to be correlated with this deficiency, but, when the two factors are associated, they could be related to the manifestation and severity of celiac disease.

6250 EFFECT OF HYPEROSMOLAR STIMULI AND COELIAC DISEASE ON THE PERMEABILITY OF THE HUMAN GASTROINTESTINAL TRACT. (Eng.) Wheeler, P. G.; Menzies, I. S.; Creamer, B. (King's Coll. Hosp. Medical Sch., London, England). *Clin. Sci. Mol. Med.* 54(5):495-501; 1978.

Oral loads with different marker substances were used to assess gastrointestinal permeability in 18 normal subjects and 5 patients with celiac disease. Lactulose (molecular weight [MW] 342), raffinose (MW 504), stachyose (MW 666), and a fluorescein-labeled dextran (MW 3,000) were used as marker substances. Timed urinary recovery of these substances, which are not metabolized, was measured by quantitative papaer chromatography and direct fluorimetry, and the results were used as an indication of passive intestinal permeability. The results in healthy adults showed that permeability to these markers was dependent on molecular size, even after correction for aqueous diffusion differences, such that a profile of restricted permeability could be described for this range of markers. Interpretation in terms of conventional pore theory suggested the presence of more than one population of pores. Ingestion of solutions made hyperosmotic by inclusion of glycerol resulted in a large increase in permeability, in a pattern that suggested an increase in either the size or frequency of a range of smaller pores. A similar increase in permeability and alteration in the profile of restriction was found in patients with celiac disease. The significance of intestinal permeability must relate to loss of metabolically important plasma constituents or absorption of antigenic, carcinogenic, or other toxic substances. A hyperosmotic stress or celiac disease, might enhance this possiblity, and increased accessibility to gliadin or its toxic fractions might, in the latter case, provide a self-perpetuating pathogenic stimulus.

6251 COWS' MILK PROTEIN-SENSITIVE ENTEROPATHY: AN IMPORTANT FACTOR IN PROLONGING DIARRHOEA OF ACUTE INFECTIVE ENTERITIS IN EARLY INFANCY. (Eng.) Iyngkaran, N.; Robinson, M. J.; Sumithran, E.; Lam, S. K.; Puthucheary, S. D.; Yadav, M. (Dept. Pediatrics, Univ. Malaya, Kuala Lumpur, Malaya). *Arch. Dis. Child.* 53(2):150-153; 1978.

The possible role of cows' milk protein in prolonging diarrhea in very young infants with acute infective enteritis was studied in 14 infants, 9 under the age of 2 months and 5 older than 6 months. Bacterial pathogens (*Salmonella* and enteropathogenic *Escherichia coli*) were isolated from the stools of four infants from the younger age group. After appropriate initial treatment, the infants were maintained on a cows' milk protein-free formula. Six weeks later jejunal biopsies were performed befor and 24 hr after challenge with a low-lactose cows' milk protein formula. The immunoglobulin and complement levels in the serum and duodenal juice we also estimated at these times. Attempts to isola bacterial and viral pathogens in stools were agai made in all patients. The five older infants cli ically tolerated cows' milk protein, and their pr and postchallenge jejunal biopsies were within normal limits. However, moderate to severe histological changes were observed in the postchalle jejunal biopsies of all 9 infants under 2 months age; in addition, five of these infants developed diarrhea. These findings suggest that, in very young infants previously fed a cows' milk protein based formula who contract infective enteritis, the jejunal mucosa suffers damage when rechalleng with cows' milk protein.

6252 RECURRENT COLONIC ULCERS IN CELIAC SPRU AN UNRECOGNIZED FATAL COMPLICATION: RE OF A CASE. (Eng.) Arvanitakis, C. (Kansas Univ. Medical Center, Rainbow Blvd. at 39th St., Kansas City, KS 66103). *Dis. Colon Rectum* 20(7):613-617 1977.

6253 EFFECT OF COW'S MILK ON THE GASTROINTES INAL TRACT: A PERSISTENT DILEMMA FOR PEDIATRICIAN. (Eng.) Eastham, E. J.; Walker, W (Massachusetts General Hosp., Boston, MA 02114). *Pediatrics* 60(4):477-481; 1977.

6254 MALNUTRITION AND MALABSORPTION: EFFEC OF NUTRITIONAL REHABILITATION ON GASTR INTESTINAL FUNCTION IN KWASHIORKOR AND MARASMUS-LONGITUDINAL STUDY. (Eng.) Pimparkar, B. D.; Donde, U. M.; Ambegaonkar, S. D.; Bharucha, P. E. (K.E.M. Hosp., Bombay, India). *Am. J. Gastro enterol.* 67(6):580-588; 1977.

6255 LACTOSE MALABSORPTION AMONG THE PIMA INDIANS OF ARIZONA. (Eng.) Johnson, J. D.; Simoons, F. J.; Hurwitz, R.; Grange, A.; Mitchell, C. H.; Sinatra, F. R. (Stanford Univ. Sch. Medicine, Stanford, CA 94305). *Gastroenter gy* 73(6):1299-1304; 1977.

6256 REVERSIBLE MALABSORPTION CAUSED BY METHYLDOPA. (Eng.) Shneerson, J. M.; Gazzard, B. G. (Whipps Corss Hosp., Leytons London E11 1NR, England). *Br. Med. J.* 2(6100): 1457; 1977.

See also, 6008, 6139, 6224, 6228, 6273, 6338,
6499, 6505, 6524, 6531, 6536, 6540,

57 DETECTION AND TREATMENT OF RECURRENT CANCER OF THE COLON AND RECTUM. (Eng.)

lch, J. P.; Donaldson, G. A. (Hartford Hosp.,
Jefferson St., Hartford, CT 06106). *Am. J. Surg.*
5(4):505-511; 1978.

series of 177 patients with recurrent colorectal
ncer treated at the Massachusetts General Hos-
tal is examined retrospectively. Two-thirds of
currences were observed by the second postopera-
ve year, and 15% of patients were asymptomatic.
lvic recurrences were usually attributable to
ctal or sigmoid tumors, whereas right-sided car-
nomas frequently spread to the liver. The most
mmon methods of clinical discovery of recurrence
cluded findings of abdominal and pelvic masses
7% and 11%, resp.), hepatomegaly (14%), and posi-
ve chest films (16%). The average survival after
scovery of recurrence was only 11 months, but 23
tients having reresections for cure lived an
erage of 33 months. Seven patients undergoing
resection for cure represented probable cures.
emotherapy with i.v. 5-fluorouracil (77 patients)
ovided poor palliation, but radiotherapy (54
tients) gave satisfactory relief of symptoms in
ny patients, particularly those with rectal or
colon lesions. A program of follow-up is sug-
sted since there is evidence that even the symp-
matic patient may be well-palliated or even cured
surgical resection of the recurrence or by pal-
ative therapy.

58 ADJUVANT RADIATION THERAPY IN COLORECTAL CARCINOMA.

(Eng.) Friedmann, P.; Park,
C.; Afonya, I. I.; Chabot, J. R.; Garb, J. L.;
e, O. T.; *et al.* (Baystate Medical Center, 759
estnut St., Springfield, MA 01107). *Am. J. Surg.*
(4):512-518; 1978.

series of 65 patients with adenocarcinoma of the
tum and rectosigmoid is reviewed. Thirty-two
tients had surgery alone (S group), 14 patients
erwent postoperative radiation therapy (PO group),
19 patients underwent preoperative radiation
rapy (PRO group). A moderate-dose program of
00 to 4,500 r was used. The PO treatment group
a higher incidence of stage C lesions (12/14
sus 7/32 in the S group and 5/19 in the PRO
up, $p<0.005$) and a higher recurrence rate (10/14
sus 4/32 in the S group and 5/19 in the PRO
up), but there were no statistically significant
ferences in survival (40% in the PO group and
in the S group at 24 months and 70% in the PRO
up at 30 months). Postoperative radiation thera-
in patients with stage C lesions did not prolong
e and is of little benefit. The PRO treatment
up tolerated the radiation very well, and there
e no major complications. Eight patients under-
t anterior resections in irradiated fields. Two
or anastomotic leaks subsequently healed spon-
eously. There were no pelvic recurrences in the
treatment group, and the incidence of lymph node
astases was 26% as opposed to 41% in the S group.
is concluded that preoperative moderate-dose
iation is not associated with increased risk of
bidity or mortality. It may be useful in reduc-
the incidence of lymph node metastases and pelvic recurrence. The effect on survival is not determined in this study.

6259 CLOSTRIDIUM DIFFICILE AND THE AETIOLOGY OF PSEUDOMEMBRANOUS COLITIS. (Eng.)

Larson, H. E.; Price, A. B.; Honour, P.; Borriello, S. P. (Clinical Research Center, Watford Road, Harrow, Middlesex HA1 3UJ, England). *Lancet* 1(8073): 1063-1066; 1978.

To demonstrate that a toxin of clostridial origin causes pseudomembranous colitis (PMC), bacterial isolates from 5 patients with histologically proven PMC, 11 healthy adults, 20 patients with other bowel disorders, and 8 healthy newborn babies were screened for toxin production. Seven strains of *Clostridium* from four PMC patients produced *in vitro* a toxin similar to that found in their fecal suspensions. These strains were identified as *C. difficile*. *C. difficile* was not isolated from any of the 31 healthy adults or patients with other bowel disorders, although it was found in five of eight neonates, and toxin was present in the feces of two of them. Strains from two of the patients induced a fatal enterocolitis when inoculated p.o. into hamsters pretreated with vancomycin. The *C. difficile* that produced the toxin *in vitro* was then re-isolated from the hamster cecal contents. These findings suggest that PMC results from infection with *C. difficile* and that previous antibiotic therapy produces susceptibility to infection.

6260 VILLOUS TUMORS OF THE RECTUM AND COLON: A PATHOLOGICAL, CLINICAL AND THERAPEUTIC STUDY AND REPORT OF 81 CASES. (Fre.)

Sarles, J.; N'Guyen, R.; Anfossi, G. (C.H.U., Hopital Nord, 13326 Marseille Cedex 3, France). *Ann. Chir.* 31(8): 699-705; 1977.

A series of 81 villous tumors occurring in 60 patients was analyzed pathologically, clinically, and therapeutically. Multiple tumors were present in 20% of patients. Degenerated tumors comprised 18.5% of the total (13 invasive cancers and 2 *in situ*). Tumors with a diameter less than 5 cm had degenerated in only 12.7% of cases, whereas those with a diameter over 5 cm were degenerated in 50% of cases; in addition, 67% of all degenerated tumors occurred in patients over 60 yr old. The chief symptoms included hemorrhage, abundant mucous discharge, and diarrhea. Pediculated tumors were removed with a diathermy loop through a sigmoidoscope with only 1/18 known recurrences. Sessile tumors within 10 cm of the anal margin were surgically removed by the perineal route, and recurrences were seen in 4/13 patients; in contrast, removal of high tumors by colotomy led to no recurrences. Segmental colectomies and abdominoperineal amputations were successful in six patients with invasive, large, or multiple sessile tumors. The authors suggest that posterior rectotomies should be used more frequently for large tumors within 10 cm of the anal margin to prevent recurrences. Malignant villous tumors treated by wide removal have an excellent prognosis.

6261 LYMPHOMA OF THE COLON: THE SPECTRUM OF RADIOLOGIC CHANGES. (Eng.) O'Connell, D. J.; Thompson, A. J. (Dept. Radiology [Box 429], Univ. Chicago, 950 East 59th St., Chicago, IL 60637). *Gastrointest. Radiol.* 2(4):377-385; 1978.

The radiographic findings of 34 patients with colonic lymphoma are reviewed. Thirteen patients had primary tumors (PT), while the remaining 21 had colonic involvement secondary to systemic disease (secondary tumors, ST). The radiologic features were mucosal nodularity (2/13 PT patients, 12/21 ST patients), endo-exoenteric mass (2/13 PT, 10/21 ST), intraluminal mass (7/13 PT, 1/21 ST), mural infiltration, and mesenteric invasion (1/13 PT and 1/21 ST in each of the latter 2 cases). One patient with diffuse mucosal nodularity developed acute colonic dilatation, while two other patients had pneumatosis coli secondary to local tumor depositions. Lymphoma is now a well-described complication of chronic ulcerative colitis, and a further case is described here. Although colonic lymphoma is a relatively rare tumor, the spectrum of radiologic changes reviewed here may enable a more accurate radiologic diagnosis.

6262 ENDOCRINE CELLS OF THE COLON IN HIRSCHSPRUNG'S AND CONTROL CHILDREN. (Eng.) Cristina, M. L.; Lehy, T.; Voillemot, N.; Arhan, P.; Pellerin, D.; Bonfils, S. (Hopital Bichat, F-75877 Paris Cedex 18, France). *Virchows Arch.* [*Pathol. Anat.*] 377(4):287-300; 1978.

To determine if any anomaly of the colonic cell population might accompany the interruption of the development of the myenteric plexus in congenital megacolon, the large intestine resected from six Hirschsprung's patients and surgical colonic biopsies from six control children were examined with light and electron microscopy. In light microscope studies, endocrine cell data were expressed as number of cells per unit area of mucosa using a quantitative method after argentaffin and Grimelius's argyrophilic techniques and an immunoperoxidase reaction with glucagon and somatostatin (SRIF) antisera. The number and frequency of endocrine cells did not differ significantly between the ganglionic and aganglionic segments of Hirschsprung's patients or between the latter and control children. Glucagon immunoreactive cells were, on the average, 5-6 times and 7-9 times more numerous than SRIF cells in the rectum and the sigmoid, resp. Ultrastructurally, five endocrine cell types were distinguished; four types are found in the normal human colon, while the fifth type, probably a transition type, apparently disappears in adults. This study has established the presence of endocrine cells along the entire distal colonic mucosa in Hirschsprung's disease.

6263 COLONIC MYOELECTRICAL ACTIVITY IN IRRITABLE-BOWEL SYNDROME. (Eng.) Sullivan, M. A.; Cohen, S.; Snape, W. J., Jr. (570 Maloney Building, Hosp. Univ. Pennsylvania, 3400 Spruce St., Philadelphia, PA 19104). *N. Engl. J. Med.* 298(16):878-883; 1978.

To determine the effect of a standard meal on colon ic myoelectrical and motor activity in the irritabl bowel syndrome and to determine the effect of a single dose of an oral anticholinergic drug (5 mg clidinium bromide) on this response, 10 patients with the irritable bowel syndrome and 21 normal co trols were studied. The patients showed a prolong increase in both colonic spike (p<0.05) and motor activity (p<0.05) after eating as compared with normal subjects. In the patients, the greatest in crease in spike activity over fasting levels occur red 30-80 min or longer after eating (p<0.005). Clidinium did not affect the frequency of colonic slow waves (early response) or the basal colonic spike and motor activity in response to a meal. H ever, the anticholinergic drug reduced the prolong postprandial colonic spike and motor response in t patients and also reduced the postprandial increas in colonic contractions at 3 cycles/min (p<0.05). These studies indicate that patients with the irritable bowel syndrome show an abnormally prolonge postprandial increase in colonic spike and motor activity. An anticholinergic drug reduces the duration and the magnitude of this abnormal coloni response.

6264 VALUE OF X-RAY, RECTOSCOPY, AND COLONO SCOPY IN THE DIAGNOSIS OF THE MAJOR DI EASES OF THE LARGE INTESTINE. (Ger.) Zastrow, R Moldenhauer, W. (Klinik fur Innere Medizin, Wilhe Pieck-Universitat, Ernst-Heydemann-Strasse 6, DDR Rostock, E. Germany). *Dtsch. Z. Verdau. Stoffwec selkr.* 37(4):167-173; 1977.

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logy with Clinic, Moscow, USSR). *Khirurgiia* (1):
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uck, Austria). *Chirurg* 48(8):541-544; 1977.

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(Dept. Pathological Anatomy, Leningrad Inst.
liatrics, Leningrad, USSR). *Vestn. Khir.* 119(8):
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ezialklinik fur Rheumakranke, DDR-6821 Etzelbach,
Germany). *Z. Gesamte Inn. Med.* 32(7):160-163;
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74 MORPHOLOGICAL STUDY OF THE VERMIFORM APPENDIX IN MOBILE APPENDIX SYNDROME.
s.) Aivazian, V. P.; Pashinian, S. A. (Dept.
p. Surgery and Pathologic Anatomy, Erevan Medi-
Inst., Erevan, USSR). *Zh. Eksp. Klin. Med.* 17
:89-95; 1977.

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(Hopital Ed.-Herriot, 69374 Lyon Cedex 2, France).
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y, Orthopedics and Traumatology, Dnepropetrovsk
ical Inst., Dnepropetrovsk, USSR). *Klin. Khir.*
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6282 INTESTINAL MOTOR ACTIVITY IN PATIENTS WITH ACUTE APPENDICITIS: PHOTOENTEROGRAPHIC DATA. (Rus.) Shekhvatov, L. D. (Central Regional Hosp., Pavlovskii Pasad, Moscow Oblast, USSR). *Sov. Med.* (9):68-71; 1977.

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6287 DIFFICULTIES AND ERRORS IN THE DIAGNOSIS OF CANCER OF THE RIGHT HALF OF THE LARGE INTESTINE. (Rus.) Fedorov, B. P.; Lokhvitskii, S. V.; Mudarov, M. S. (Clinic General Surgery, I. M. Sechenov 1st Moscow Medical Inst., Moscow, USSR). *Khirurgiia (Mosk.)* (7):138-142; 1977.

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6289 PLACE OF ADJUVENT SURGICAL TREATMENT IN COLONIC AND RECTAL CARCINOMA. (Fre.) Dionne, L. J.; Kibrite, A.; Martin, M. (Hotel-Dieu de Quebec, 11 Cote du Palais, Quebec GIR 2J6, Canada). *Can. J. Surg.* 21(1):47-51; 1978.

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6303 THE SIGNIFICANCE OF HIGH-FIBER DIET I THE TREATMENT OF DIVERTICULOSIS, OBST PATION, AND MUCOUS COLITIS. (Ger.) Gnauck, R. (Deutsche Klinik fur Diagnostik, Aukammallee 33 6200 Wiesbaden, W. Germany). *Therapiewoche* 27(6411-6412; 1977.

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etrovsk Scientific Res. Inst. Gastroenterology,
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de la Porte-de-Trivaux, F 92141 Clamart, France). *Gastroenterol. Clin. Biol.* 1(8/9):681-704; 1977.

6310 SENILE ECTASIA OF THE COLON. (Ger.) Simonyi, I. (Budapest Krankenhauses "Margit," 1300 Budapest III Pf. 41, Hungary). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(4):387-388; 1977.

6311 ANAL FISTULAS. (Fre.) Bernard, D. (Hopital Saint-Luc, Montreal, Quebec, Canada). *Can. J. Surg.* 20(5):421-426; 1977.

See also, 6018, 6070, 6072, 6074, 6081, 6100, 6221, 6226, 6229, 6234, 6243, 6252, 6318, 6321, 6339, 6340, 6392, 6498, 6506, 6508, 6519, 6525, 6538, 6540, 6547, 6551, 6555, 6556.

LARGE INTESTINE

Ulcerative Colitis

312 RADIOGRAPHIC CHARACTERISTICS OF COLONIC
"MUCOSAL BRIDGES": SEQUELAE OF INFLAM-
ATORY BOWEL DISEASE. (Eng.) Hammerman, A. M.;
hatz, B. A.; Susman, N. (Jewish Hosp. St. Louis,
16 S. Kingshighway, St. Louis, MO 63108). *Radi-
logy* 127(3):611-614; 1978.

he occurrence of colonic "mucosal bridges" as
equelae to inflammatory bowel disease, previously
escribed pathologically and endoscopically, are
escribed radiographically using two case reports
a 35-yr-old man and a 33-yr-old woman). The radio-
raphic pattern is that of multiple, long, linear,
ranching band-like filling defects. In the first
ase, they demonstrated a constant appearance at
nnual examinations over a 10-yr period, indicating
he durable nature of these structures. The bridges
ere mucosal-covered bands up to 15 cm in length
average lenth, 4-6 cm) crossing the lumen. They
anged from 0.4-0.6 cm in diameter. The basic
isease process in this case was difficult to
lassify precisely (i.e., regional enteritis versus
lcerative colitis). In the second case, a patient
ith ulcerative colitis, the radiographic pattern
iggested mucosal bridges, and at colonoscopy, long
nflammatory polyps, thickened mucosal folds, and
ucosal bridges were seen. Any disease of the
olon with the propensity to develop deep ulcera-
ions may possibly form mucosal bridges.

313 SERUM LYSOZYME, SERUM PROTEINS, AND IM-
MUNOGLOBULIN DETERMINATIONS IN NONSPECIFIC
FLAMMATORY BOWEL DISEASE. (Eng.) El-Khatib, O.
; Lebwohl, O.; Attia, A. A.; Flood, C. A.; Stein,
A.; Sweeting, J. G.; *et al.* (Coll. Physicians &
Surgeons, Columbia Univ., New York, NY). *Am. J. Dig. Dis.* 23(4):297-301; 1978.

The usefulness of serum lysozyme determinations in the differential diagnosis of nonspecific inflammatory bowel disease (IBD) into ulcerative colitis (UC), Crohn's disease (CD), or ulcerative proctitis (UP) was analyzed in 101 IBD patients. In addition, the disease activity was assessed independently of the laboratory findings by prospective determination of the serum lysozyme and immunoglobulin levels and by serum electrophoresis. Patients' disease states were categorized as active or inactive by clinical signs and symptoms observed when the serum samples were drawn. Although the mean serum lysozyme concentration of patients with CD (10.5 ± 6.8 μg/ml) and UC (9.6 ± 4.1 μg/ml), determined by a standardized lysoplate method, was significantly greater than that of normal controls (6.0 ± 1.5 μg/ml, $p<0.05$), the results did not correlate with the diagnosis or with the degree of disease activity. Individually separated protein fractions and serum immunoglobulins also did not correlate with the serum lysozyme levels. This study indicates that measurement of the level of serum lysozyme in individual patients is not helpful in determining the cause or degree of activity of nonspecific IBD.

6314 ABSENCE OF K CELLS IN HUMAN GUT MUCOSA. (Eng.) Clancy, R.; Pucci, A. (Faculty Medicine, Univ. Newcastle, NSW, Australia). *Gut* 19(4):273-276; 1978.

To determine whether antibody-dependent cell-mediated cytotoxicity (ADCC) operates as a cause of tissue cell damage in inflammatory disease of the small and large bowel, cell suspensions of mucosal lymphocytes prepared from human gut resections or biopsies were assayed by two methods for ADCC. In the first method, the Chang hepatoma cell assay was used with rabbit anti-Chang cell antibody; in the second method, the Chang cells were coated with *Escherichia coli* lipopolysaccharide, and pooled sera from six normal sybjects shown to have agglutinating activity against the *E. coli* lipopolysaccharide were used. In both cases, ADCC was measured as the specific release of ^{51}Cr from the prelabeled target cells. Gut mucosal lymphocytes from normal subjects and subjects with ulcerative colitis, Crohn's disease, and colon carcinoma were examined by at least one of the methods; blood lymphocytes from each subject were used as controls. Whereas ADCC activity was regularly demonstrated in the blood lymphocytes of all subjects by both assays (specific cytotoxicity, 1-67%), ADCC activity was not detected with mucosal lymphocytes with either assay (0-1% specific cytotoxicity). The possibility that K-cell activity was masked by adsorbed blocking factors was examined by preincubating gut lymphocytes and by treating them with trypsin; blood lymphocytes were again used as controls. Neither treatment allowed the detection of meaningful K-cell activity in gut lymphocytes (0-3% specific cytotoxicity, compared with 0-12% with blood lymphocytes, 0% being recorded only after a 24-hr incubation and probably reflecting a short lifespan in cultures for K cells). It appears that cells capable of mediating ADCC cannot be isolated from either normal or inflamed human colon mucosa. This technique will facilitate the direct study of the cellular basis of mucosal defense mechanisms and the pathogenesis of mucosal disease in man.

6315 SIGNIFICANCE OF ANERGY TO DINITROCHLOROBENZENE (DNCB) IN INFLAMMATORY BOWEL DISEASE: FAMILY AND POSTOPERATIVE STUDIES.

(Eng.) Meyers, S.; Sachar, D. B.; Taub, R. N.; Janowitz, H. D. (Annenberg 23-02, Mount Sinai Sch. Medicine, New York, NY 10029). *Gut* 19(4):249-252; 1978.

To evaluate the pathogenetic significance of impaired cellular immunity in inflammatory bowel disease (IBD), the cutaneous responsiveness to dinitrochlorobenzene (DNCB) was measured in 58 patients with IBD (33 with Crohn's disease and 25 with ulcerative colitis), 63 of their clinically normal relatives, 24 additional ileitis and colitis patients who had undergone resection of all visibly diseased bowel, and 23 control subjects. Cutaneous anergy to DNCB was demonstrated among 70% of the patients with Crohn's disease and 48% of those with ulcerative colitis, compared with only 9% of controls ($p<0.001$). There was no increased incidence of anergy among either 44 first-degree relatives (7%) or 19 spouses (0%), nor was there any special proclivity toward anergy among six pairs of patients with familial inflammatory bowel disease. In Crohn's disease, anergy was still present after bowel resection in 6 of 10 patients, while in ulcerative colitis anergy was found after colectomy in only 2 of 14 patients. The data suggest that the immune defect in patients with IBD may be a secondary phenomenon. In ulcerative colitis, the defect appears to reverse after colectomy, but in Crohn's disease it persists despite resection. Thi finding is consistent with the observed tendency of Crohn's disease, but not ulcerative colitis, to inexorable postoperative recurrence.

6316 II. PREVALENCE OF PERIPHERAL ARTHRITIS, SACROILIITIS, AND ANKYLOSING SPONDYLITIS IN PATIENTS SUFFERING FROM INFLAMMATORY BOWEL DISEASE.

(Eng.) Dekker-Saeys, B. J.; Meuwissen, S. G. M.; van den Berg-Loonen, E. M.; de Haas, W. H. D.; Agenant, D.; Tytgat, G. N. J. (Amsterdam Cente for Rheumatic Diseases, Amsterdam, Netherlands). *Ann. Rheum. Dis.* 37(1):33-35; 1978.

To establish the prevalence of peripheral arthriti (PA), radiographic sacroiliitis (RSI), and ankylos ing spondylitis (AS) in patients with inflammatory bowel disease, 58 consecutive patients with ulcera tive colitis (UC) and 51 with Crohn's disease (CD) underwent a detailed rheumatological examination. In addition, all patients were screened for the presence of the antigen human lymphocyte antigen (HLA) B27. PA was found in 8 UC and 6 CD patient RSI was diagnosed in 5 UC and 6 CD patients, of whom 10 were asymptomatic, and AS was diagnosed i 2 UC and 2 CD patients. HLA B27 was found in 18. of the UC and 3.9% of the CD patients. One of the 11 patients with RSI and 2 of the 4 with AS had t HLA B27 antigen. PA, RSI, and AS are apparently frequent manifestations in patients with inflammatory bowel disease. Asymptomatic RSI in these patients appears to differ from idiopathic AS, both clinically and genetically. Evaluation of subjective rheumatological complaints, necessary for a confident diagnosis of AS, according to the New York criteria, is difficult during a flare-up of the inflammatory bowel process, as was shown in f CD cases with marked limitation of lumbovertebral function and chest expansion, but no radiological abnormalities of the sacroiliac joints.

6317 III. CLINICAL CHARACTERISTICS AND RESU OF HISTOCOMPATIBILITY TYPING (HLA B27) 50 PATIENTS WITH BOTH ANKYLOSING SPONDYLITIS AND FLAMMATORY BOWEL DISEASE.

(Eng.) Dekker-Saeys, J.; Meuwissen, S. G. M.; van den Berg-Loonen, E. de Haas, W. H. D.; Meijers, K. A. F.; Tytgat, G. J. (Amsterdam Center for Rheumatic Diseases, Ams dam, Netherlands). *Ann. Rheum. Dis.* 37(1):36-41; 1978.

To determine the genetic and clinical characteri tics of patients with both inflammatory bowel di ease (IBD) and ankylosing spondylitis (AS), a st was made, in cooperation with several gastroente ology and rheumatology centers, of 50 patients w either Crohn's disease (CD, 38 patients) or ulce ated colitis (UC, 12 patients), all 50 of whom a had AS (the latter diagnosis being established a cording to the New York criteria). Human lympho cyte antigen (HLA) B27 was positive in 20 CD and UC patients. These frequencies were statistical significant ($p<0.001$ or $p<0.01$) when compared t

ntrols examined in a separately published series.
e presence of HLA B27 was studied in relation to
inical parameters, such as first occurrence of
mptoms of AS or IBD, a history of peripheral
thritis, iridocyclitis, and a positive history of
or IBD. The patients were found to have hetero-
neous clinical features: at one end of the spec-
um, a group of cases was distinguished with the
pical characteristics of idiopathic AS, often
ing HLA B27 positive. At the other end, a smaller
oup of HLA B27-negative patients was observed,
th severe intestinal inflammatory pathology,
cking most of the typical clinical features of
iopathic AS ("secondary" form of AS). Finally,
tween these two extremes, a group of patients was
und with less pronounced clinical or genetic
aracteristics. These different clinical and his-
compatibility patterns suggest a mixed etiopatho-
nesis of AS in IBD patients. Such a "syndrome"
AS might harbor both idiopathic AS and forms of
"secondary" to the intestinal inflammatory path-
ogy.

18 CHRONIC ULCERATIVE COLITIS AND COLON CAN-
CER: CAN RADIOGRAPHIC APPEARANCE PREDICT
RVIVAL PATTERNS? (Eng.) James, E. M.; Carlson,
C. (Mayo Clinic, Rochester, MN 55901). *Am. J.*
ntgenol. 130(5):825-830; 1978.

enty-four patients with chronic ulcerative colitis
l colon carcinoma who underwent barium enema ex-
ination prior to the diagnosis of cancer were
idied to correlate the radiographic appear-
ce of the tumors with their biologic behav-
, as well as to assess the accuracy of the barium
ema in tumor detection. Of the radiographically
ected tumors, 65% displayed an annular infiltra-
e appearance, with the prime radiographic mani-
station being relative nondistensibility of the
olved segment. The remaining tumors had various
earances (nodular or polyploid; annular, bulky;
villous) more typical of noncolitic colon cancer.
ients with infiltrative lesions had a much poorer
gnosis than those with noninfiltrative lesions.
33 gross tumors described pathologically and/or
gically, only 70% were correctly detected by
ium enema. It is suggested that periodic barium
ma examinations are an unreliable means of fol-
ing patients with ulcerative colitis if malignant
degeneration is to be detected at an early and curative stage. Prophylactic proctocolectomy may be the best therapeutic approach.

6319 DEFICIENCY OF FREE SECRETORY COMPONENT (fSC) OF SALIVARY IgA IN INFLAMMATORY BOWEL DISEASE (IBD)--A FAMILY STUDY [Abstract]. (Eng.) Engstrom, J. F.; Sagawa, A.; Arvanitakis, C.; Abdou, N. I. (Kansas Univ. Sch. Medicine, Kansas City, KS). *Gastroenterology* 72(5, Part 2):1158; 1977.

6320 VIRAL INVESTIGATIONS IN INFLAMMATORY BOWEL DISEASE [Abstract]. (Eng.) Gitnick, G. L.; Rosen, V. J. (Univ. California, Los Angeles, CA). *Gastroenterology* 72(5, Part 2):1062; 1977.

6321 INCIDENCE OF FIRST HOSPITALIZATIONS FOR ULCERATIVE COLITIS, ULCERATIVE PROCTITIS, AND CROHN'S DISEASE IN BALTIMORE: A TEN-YEAR COMPARISON [Abstract]. (Eng.) Mendeloff, A. I.; Garagliano, C. F.; Lilienfeld, A. M. (No affiliation given). *Gastroenterology* 72(5, Part 2):1163; 1977.

6322 MORTALITY FROM ULCERATIVE COLITIS IN DENMARK 1960-1969. (Eng.) Kristensen, E.; Mosbech, J. (Copenhagen County Hosp., St. Elisabeth, 2300 Copenhagen, Denmark). *Scand. J. Gastroenterol.* 12(2):189-191; 1977.

6323 EVALUATION OF CANCER RISK IN CHRONIC ULCERATIVE COLITIS: PROGRESS REPORT OF A PROSPECTIVE STUDY [Abstract]. (Eng.) Levin, B.; Riddell, R. H. (Univ. Chicago Hosp., Chicago, IL). *Gastroenterology* 72(5, Part 2):1088; 1977.

See also, 6044, 6081, 6088, 6265, 6273, 6297, 6303, 6364, 6499, 6524, 6540.

PANCREAS

4 THE PANCREAS: A CORRELATION OF FUNCTION
AND STRUCTURE. (Eng.) Waye, J. D.;
er, M.; Dreiling, D. A. (Mount Sinai Sch. Medi-
e, City Univ. New York, New York, NY). *Am. J.*
troenterol. 69(2):176-181; 1978.

compare the diagnostic value of endoscopic pan-
atography with secretin tests obtained from the
e patients, 52 patients with or without pancre-
c disease were studied with both the secretin
t and endoscopic retrograde pancreatography
(ERCP). Pancreatic histopathology was obtained by exploratory laparotomy in half of these patients to permit correlation of histology with ERCP and the secretin test. Of 21 patients with normal secretin tests, 14 had no clinical evidence of pancreatic disease and a normal ERCP, 3 had normal ERCP consistent with acute pancreatitis (2) and recurrent acute pancreatitis (1), and 4 had beading of the pancreatic duct on ERCP and histologically proven chronic pancreatitis. Of 21 patients with secretin tests suggesting chronic pancreatitis, 17

such diagnoses were histologically proven (12/17 also had abnormal ERCP); the remaining 4 had normal ERCP and histological evidence was lacking. Of four patients with secretin tests showing hypersecretion and who had normal ERCP, diagnoses of chronic hepatitis (1), primary biliary cirrhosis (1), and chronic pancreatitis (1) were histologically proven, and the unconfirmed diagnosis of early alcoholic pancreatitis (1) was made. In six patients with secretin tests showing low volume, three had abnormal ERCP (2 had carcinoma, 1 had had partial pancreatic resection); of the three with normal ERCP, one had chronic pancreatitis with fibrosis, and two had normal pancreas at laparotomy. It is concluded that (1) secretory tests are the most sensitive indicators of chronic pancreatitis, although not all cases of chronic pancreatitis will be discovered by this test, (2) when secretory tests show low volume output, pancreatography is crucial in differentiating between malignant ductal obstruction or pancreatic replacement by fibrosis or atrophy, (3) histologic correlation with ductular structure and/or secretin function is frequently discordant, and (4) the secretin test and pancreatogram measure different parameters, and the use of both these complementary studies will lead to increased diagnostic accuracy and better understanding of pancreatic pathophysiology.

6325 CLINICAL AND STATISTICAL STUDIES ON CONGENITAL DILATATION OF THE BILIARY TRACT IN RELATION TO ANOMALOUS ARRANGEMENT OF THE PANCREATICOBILIARY DUCTS. (Eng.) Udaka, H. (Sch. Medicine, Tokushima Univ., Tokushima, Japan). *Tokushima J. Exp. Med.* 24(3/4):165-173; 1977.

Among 16 cases of congenital dilatation of the biliary tract seen over a 4-yr period, 6 were found to be complicated by anomalous arrangement of the pancreaticobiliary ducts, prompting a nationwide search for similar cases in Japan. Among 852 cases of congenital dilatation of the biliary tract collected from major medical institutions, 570 cases supplied satisfactory information for detailed analysis. The male:female ratio was 3:7. The incidence was high in childhood (245/570 with 63/245 at less than 1 yr of age and 172/245 at less than 5 yr of age). Anomalous arrangement of the pancreaticobiliary ducts was found in 183/570 cases. A new morphological classification of dilatation of the biliary tract is proposed (cystic, spindle, cylindrical, rosary, and diverticular dilatation), and an anatomical classification of anomalous arragements of the pancreaticobiliary ducts is offered: (1) the common bile duct flows into the pancreatic duct (118/183 cases), (2) the pancreatic duct flows into the common bile duct (38/183 cases), and (3) the common bile duct flows into the main pancreatic duct and an accessory pancreatic duct is present (12/183 cases). There were 15/183 cases in which the anomaly was too complex to be classified in this system. From the present clinical and statistical investigations, anomalous arrangement of the pancreaticobiliary ducts can be postulated as one of the etiological factors of the congenital dilatation of the biliary tract.

6326 MACROAMYLASEMIA AND OTHER CHRONIC NONSPECIFIC HYPERAMYLASEMIAS: CHEMICAL ODDITIES OR CLINICAL ENTITIES. (Eng.) Warshaw, A. L.; Lee, K. H. (Massachusetts General Hosp., Bosto MA 02114). *Am. J. Surg.* 135(4):488-493; 1978.

Because macroamylasemia has been regarded as an associated phenomenon in other primary diseases an only a coincidental biochemical oddity, its significance as a clinical entity (as a determinant o erroneous diagnosis and overtreatment) and perhaps as a genuinely symptomatic pathophysiologic proces was evaluated, and a new form of chronic hyperamylasemia is described. Seventeen patients with chronic hyperamylasemia (of whom 3 had alcoholic liver cirrhosis; 2, duodenal ulcer; 2, gallstones; and 1, leukemia) were studied using standard clinical and laboratory parameters, amylase/creatinine clearance ratios, and polyacrylamide gel electrophoresis of serum amylases. These patients, none of whom had evidence of pancreatic disease or othe specific source for the elevated serum amylase, fell into three groups: (1) normal serum isoamylase profile and normal amylase clearance (6 patients), (2) macroamylasemia and very low amylase clearance rates (9 patients), and (3) salivary-type hyperamylasemia and low amylase clearance ra (2 patients). It is postulated that the generalized hyperamylasemia in group (1) may be due to reduced extrarenal catabolism of amylase, a previously undescribed phenomenon. Seven of the nin patients in group (2) had recurrent epigastric pain. Evidence for an autoimmune basis of this entity is discussed. The entity in group (3) may really be macroamylasemia in which the macroamylase complex dissociated during analysis. Chroni hyperamylasemia is often not of pancreatic origin The assumption that the pancreas is at fault, especially if there is abdominal pain, may cause morbidity due to gross overtreatment.

6327 ANGIOGRAPHY OF PANCREATIC ARTERIOVENOUS MALFORMATION. (Eng.) Chuang, V. P.; Pulmano, C. M.; Walter, J. F.; Cho, K. J. (Univ. Kentucky Medical Center, Lexington, KY 40506). *Am. J. Roentgenol.* 129(6):1015-1018; 1977.

6328 THE DIAGNOSTIC EVALUATION OF ERCP IN PANCREATIC AND BILIARY CARCINOMA. (Eng Ogoshi, K.; Niwa, M. (Niigata Hosp., Kawagishicho Niigata, 951 Japan). *Gastroenterol. Jpn.* 12(3): 218-223; 1977.

6329 PROLONGED OBSTRUCTIVE JAUNDICE AND GIA CELL HEPATITIS IN AN INFANT WITH CYSTI FIBROSIS [Letter to Editor]. (Eng.) Rosenstein J.; Oppenheimer, E. H. (Johns Hopkins Hosp., Par 601 N. Broadway, Baltimore, MD 21205). *J. Pedia* 91(6):1022-1023; 1977.

6330 PANCREAS ABSCESS: A FATAL COMPLICATIO OF ENDOSCOPIC CHOLANGIOPANCREATOGRAPHY

ERCP). (Eng.) Tseng, A.; Sales, D. J.; Simonowitz,
. A.; Enker, W. E. (Univ. Chicago Pritzker Sch.
edicine, 950 East Fifty-Ninth Street, Chicago, IL
0637). *Endoscopy* 9(4):250-253; 1977.

331 PANCREATIC PSEUDOCYST WITH MASSIVE ASCITES.
(Eng.) Hardy, T. J.; Madge, G. E. (Medical
oll. Virginia, Virginia Commonwealth Univ., Rich-
ond, VA 23298). *South. Med. J.* 70(12):1472-1473;
977.

332 MUCINOUS BILIARY OBSTRUCTION ASSOCIATED
WITH A CYSTIC ADENOCARCINOMA OF THE PAN-
REAS. (Eng.) Ito, Y.; Blackstone, M. O.; Frank,
. H.; Skinner, D. B. (Univ. Chicago Pritzker
Sch. Medicine, Box 400, 950 East 59th St., Chicago, IL 60637). *Gastroenterology* 73(6):1410-1412; 1977.

See also, 6038, 6047, 6061, 6063, 6067, 6092, 6234, 6236, 6333, 6338, 6349, 6410, 6499, 6508, 6524, 6540.

PANCREAS

Pancreatitis

33 GUIDELINES IN THE MANAGEMENT OF PATIENTS
WITH PANCREATIC ABSCESS. (Eng.) Paloyan,
; Simonowitz, D.; Bates, R. J. (Dept. Surgery,
niv. Chicago, Chicago, IL). *Am. J. Gastroenterol.*
)(1):97-100; 1978.

systematic approach to the management of patients
th pancreatic abscess is presented. The method
cludes an aggressive diagnostic approach relying
radiographic and ultrasound examinations and
lequate transperitoneal drainage of the abscess,
upled with gastrostomy and feeding jejunostomy.
e importance of nutritional support using an
emental diet administered through a jejunostomy
emphasized.

34 GLUCAGON VS ANTICHOLINERGICS IN THE TREAT-
MENT OF ACUTE PANCREATITIS: A DOUBLE-
IND CONTROLLED TRIAL. (Eng.) Gilsanz, V.; Oteyza,
P.; Rebollar, J. L. (Medical Sch., Universidad
mplutense de Madrid, Madrid, Spain). *Arch. Intern.
d.* 138(4):535-538; 1978.

test the therapeutic effect of glucagon on acute
ncreatitis and to compare the results with those
a control group treated with an anticholinergic,
patients with acute pancreatitis, evaluated for
verity according to uniform standards, were treat-
identically except that patients in one group re-
ived glucagon hydrochloride (group A) and those
the other, oxyphenonium bromomethylate (group B)
doses of 1 mg i.v. every 4 hr for 4 days. Each
the two homologous series comprised 31 patients,
d mortality was the same for both groups (3/31).
atistical comparison of both series showed no
gnificant differences in frequency of expected
mplications or in fall of serum amylase levels.
During treatment, serum calcium levels were significantly reduced in group A ($p<0.005$), and the duration of the abdominal pain was shortened ($p<0.05$). The volume of gastric aspirate was smaller in group B ($p<0.005$), and vesical catheterization proved necessary more frequently ($p<0.005$). Thus, similar results are obtained when glucagon or anticholinergics are employed in the treatment of acute pancreatitis, although secondary effects differ.

6335 THE ROLE OF PERITONEAL LAVAGE IN SEVERE ACUTE PANCREATITIS. (Eng.) Ranson, J. H. C.; Spencer, F. C. (New York Univ. Medical Center, 560 First Ave., New York, NY 10016). *Ann. Surg.* 187(5):565-575; 1978.

Clinical experience with the management of acute pancreatitis and an evaluation of the therapeutic efficacy of peritoneal lavage are presented in 103 patients with "severe" pancreatitis (28% mortality) who were separated from 347 with "mild" pancreatitis (0.9% mortality) by previously described early objective signs. Early treatment (day 0-7) of severe pancreatitis included peritoneal lavage through catheters placed nonoperatively in 18 patients (group A) and by catheters placed at laparotomy in 6 (group C). Early treatment of nonlavage patients with severe pancreatitis was by standard nonoperative measures in 61 cases (group B) and included early operation in 18 (group D). Lavage was continued for 48-96 hr, usually using 36-48 liters/24 hr of balanced isotonic dialysate fluid, and was uncomplicated. Lavage led to striking immediate clinical improvement and no lavaged patient (groups A and C) died during the first 10 days of treatment for pancreatitis. By contrast, 45% of deaths in nonlavaged patients (groups B and D) occurred during this early period, usually from cardiovascular or respiratory failure. Although lavage reduced mortality in subgroups of patients, ultimate overall survival was not affected (Group A, 83%; B, 84%; C, 33%; D, 33%). Late peripancreatic abscesses caused most deaths in lavaged patients. These data show that peritoneal lavage is a highly effective adjunct to the treatment for early complications of severe acute pancreatitis and dramatically reduces early mortality. Lavage does not prevent the late local sequelae of peripancreatic necrosis.

6336 PANCREATITIS IN CHILDHOOD. (Eng.) Buntain, W. L.; Wood, J. B.; Woolley, M. M. (Children's Hosp., 1601 Sixth Ave. South, Birmingham, AL 35233). *J. Pediatr. Surg.* 13(2):143-149; 1978.

All 30 cases of pancreatitis in children diagnosed at one institution during the period 1957-1972 are reviewed. Diagnosis was based on the clinical findings of pancreatic inflammation, laboratory confirmation with elevated serum and/or urinary amylase values, and in some cases surgical or postmortem evidence of peripancreatic fat necrosis and/or intramedullary fat necrosis with or without hemorrhagic manifestations. Four major classes of pancreatitis were seen and defined in children: traumatic (10 cases), systemic disease associated (7), drug-induced, caused by drug therapy for various life-threatening diseases (7), and chronic pancreatitis, with or without an anatomic abnormality (3). In addition, there were two cases of idiopathic acute pancreatitis and one of idiopathic acute relapsing pancreatitis. The overall mortality was 8/30, which compares unfavorably with the 12% mortality usually seen in adults with pancreatitis. If cases of traumatic pancreatitis are excluded, girls outnumber boys 5 to 1; patients ranged in age from 2 to 18 yr. A high index of suspicion is necessary to make the diagnosis, and this is very important if the mortality for pancreatitis in children is to be lowered. Awareness and consistent early aggressive intervention should increase the salvage rate. Pancreatitis is not as rare in the pediatric age group as has been commonly believed.

6337 THE FIRST 24 HOURS OF ACUTE PANCREATITIS: CHANGES IN BIOCHEMICAL AND ENDOCRINE HOMEOSTASIS IN PATIENTS WITH PANCREATITIS COMPARED WITH THOSE IN CONTROL SUBJECTS UNDERGOING STRESS FOR REASONS OTHER THAN PANCREATITIS. (Eng.) Drew, S. I.; Joffe, B.; Vinik, A., Seftel, H.; Singer, F. (Dept. Surgery, Univ. California, Los Angeles, CA 90024). *Am. J. Med.* 64(5):795-803; 1978.

Because the changes in biochemical and endocrine homeostasis in acute pancreatitis reflect both stress and the disease itself and because it is difficult to quantitate the magnitude of the stress response, two patient groups were compared. As a group, 20 patients with acute pancreatitis showed alterations in biochemical and endocrine homeostasis that differed from the metabolic reactions observed in 13 control patients undergoing stress for reasons other than pancreatitis. In patients with acute pancreatitis, hyperglycemia was associated with inappropriately low serum insulin levels ($p<0.005$). Plasma glucagon concentrations were markedly increased in the patients with acute pancreatitis and exceeded control values ($p<0.0001$) throughout the 24-hr study period. The lipolytic effect of the inadequate serum insulin concentrations, elevated blood cortisol levels, and hyperglucagonemia produced a rise in the levels of nonesterified fatt acid. Serum gastrin and growth hormone measurements remained within the normal range. Plasma parathyroid hormone and calcitonin concentrations were increased in both patient populations, although calcitonin levels in patients with pancreatitis were significantly lower than those in the control group ($p<0.001$). In patients experiencing a recurrent attack of pancreatitis, plasma glucagon levels were low ($p<0.005$) compared with levels in patients experiencing their first episode of acute pancreatitis. Appreciation of the metabolic derangements in acute pancreatitis that are independent of the normal metabolic changes that occur in response to stress will help to rationalize exogenous endocrine therapy and possibly the prognosti accuracy in this disease.

6338 ENTEROPEPTIDASE LEVELS IN DUODENAL JUICE OF NORMAL SUBJECTS AND PATIENTS WITH GASTROINTESTINAL DISEASE. (Eng.) Rinderknecht, H.; Nagaraja, M. R.; Adham, N. F. (Veterans Admin. Hosp., Sepulveda, CA 91343). *Am. J. Dig. Dis.* 23 (4):327-331; 1978.

To establish a baseline for the study of a possibl role of enteropeptidase in gastrointestinal disease in adults, enteropeptidase, trypsin, and chymotrypsin activities in basal and secretin (1 U/kg, i.v.)-stimulated duodenal juice of 20 normal adults and 15 patients with gastrointestinal disease were determined. All enzyme concentrations showed skew distributions, but fluctuations in the secretin-stimulated juices were less pronounced than in the basal secretions. Secretin administration had no influence on the release of enteropeptidase from human duodenal mucosa, but it resulted in a very small increase in secretion of pancreatic enzymes. Six of seven patients with chronic alcoholic pancreatitis or cancer of the pancreas exhibited highly significant elevations of enteropeptidase in their basal as well as secretin-stimulated duodenal juice (152 ± 51.6 and 163.4 ± 28.1 mIU/g protein, resp., compared with 66.6 ± 19.7 and 38.8 ± 6.0 mIU/g in normal controls and 129 ± 33.9 and 112 ± 22.5 mIU/g in patients with gastrointestinal disease). It is suggested that raised luminal enteropeptidase activit may be the result of pancreatic insufficiency or elevated blood glucagon concentrations.

6339 THE SPECTRUM OF COLONIC INVOLVEMENT IN PANCREATITIS. (Eng.) Grodsinsky, C.; Ponka, J. L. (Henry Ford Hosp., 2799 West Grand Blvd., Detroit, MI 48202). *Dis. Colon Rectum* 21(1 66-70; 1978.

Colonic involvement in pancreatitis is demonstrate

3 case histories selected from 14 patients who
d colonic involvement of varying severity. In
x patients, this complication occurred during the
rst attack of pancreatitis. Seven other patients
d recurrent pancreatitis, and one had no history
pancreatitis. Alcohol was the etiologic factor
12 cases. In seven patients, the colonic in-
lvement resolved spontaneously. Surgical inter-
ntion was required in the other seven cases. Ex-
rience with these patients suggests that colonic
volvement may be characterized by three patterns
anatomic involvement: (1) early adynamic or
calized paralytic ileus, (2) fibrosing or sten-
ing pericolitis, and (3) colonic necrosis and
stulization. In the first, the extent of in-
lvement is shown radiologically by the cut-off
gn, which quickly disappears in response to con-
rvative treatment. When the patient has stenosis
condary to fibrosing pericolitis that may be in-
stinguishable from malignancy, elective resection
indicated. When necrosis has led to fistuliza-
on producing massive bleeding, external drainage
the necrotic collection and proximal colostomy
y be the procedure of choice.

0 NECROSIS OF THE COLON SECONDARY TO PANCRE-
ATITIS. (Eng.) Thompson, W. M.; Pizzo,
V.; Kelvin, F. M.; Rice, R. P. (Duke Univ. Medi-
Center, Durham, NC 27710). *Am. J. Dig. Dis.*
Suppl. 5):92S-96S; 1978.

case of a 56-yr-old woman who developed radio-
phic evidence of transverse colon inflammation
condary to acute pancreatitis and who subsequently
veloped necrosis of the colon is reported. Six-
n years prior to the acute pancreatitis she had
a 90% gastrectomy and gastrojejunostomy. She
a mild diabetic, well-controlled on oral medi-
ion. One month after discharge following treat-
t for pancreatitis and severe inflammation of
colon, she presented with a 2-week history of
current severe abdominal pain; on the 10th hos-
al day, she had gross rectal bleeding and became
kedly obtunded. Abdominal radiographs revealed
dence of a pancreatic abscess and changes con-
tent with necrosis in the splenic flexure. Ex-
ratory laparotomy revealed a necrotic transverse
on with extensive abscess and fat necrosis in
upper retroperitoneal area. Despite transverse
ectomy, ileostomy, and drainage of the abscesses,
patient died on the second postoperative day.
hologic examination of the surgical specimen re-
led a markedly thinned colonic wall, numerous
sions of the mucosa, fibrinous adhesions, focal
crosis, acute inflammatory infiltrate and necro-
of the muscle cells of the muscularis, and nu-
ous thrombosed small vessels. Obvious findings
peritonitis were revealed at autopsy. The colon
crosis may have been due to a combination of the
semination of pancreatic enzymes in the trans-
se mesocolon and the development of the pancre-
c abscess. Because the clinical presentation of
hemic colitis and colon necrosis due to pancrea-
is may be masked by the signs and symptoms of
underlying disease, a contrast enema should be
formed in all patients suspected of having colon-
manifestations of pancreatitis.

6341 PANCREATITIS--A RARE COMPLICATION OF SCHONLEIN-HENOCH PURPURA. (Eng.) Puppala, A. R.; Cheng, J. C.; Steinheber, F. U. (7307 Rustic Valley, Dallas, TX 75248). *Am. J. Gastroenterol.* 69(1):101-104; 1978.

The case of a 54-yr-old woman who developed hemorrhagic pancreatitis as a complication of Schonlein-Henoch purpura is reported. One day after beginning p.o. tetracycline for an upper respiratory infection, she developed a rash over her legs and discontinued the medication. The next day, she presented with arthralgia of the left wrist and right elbow, nausea, epigastric pain, vomiting of coffee-ground material, rectal bleeding, weakness, and dizziness. The day after admission, she developed vague, colicky abdominal pain; on the second hospital day, new erythematous patches appeared over her forehead that were shown by biopsy to be a nonspecific perivasculitis. On the third hospital day, the patient developed severe epigastric pain and tenderness, had a serum amylase level of 340 Somogyi U/100 ml and a urine amylase excretion of 550 U/hr (normal maximum, 300 U/hr). A barium upper gastrointestinal x-ray showed thick duodenal and jejunal folds giving rise to a "stacked coin" appearance. The rash disappeared in 1 week; abdominal pain and fluctuating serum amylase and urine amylase excretion levels gradually decreased. A brief literature review of Schonlein-Henoch purpura is given. The patient had a history of upper respiratory infection and tetracycline treatment, both of which are implicated in the etiology of this syndrome. As there were no other etiological factors, the acute pancreatitis is viewed as a rare complication of the syndrome.

6342 SURGICAL MANAGEMENT OF CHRONIC PANCREATITIS. (Ita.) Petronio, R.; Vantini, I.; Marzoli, G. P.; Piubello, W.; Pederzoli, P.; Puchetti, V.; *et al.* (Clinica Chirurgica II, Universita di Padova, Sede di Verona, Via Mameli 20, Verona, Italy). *Minerva Med.* 68(30):2109-2121; 1977.

6343 CURRENT STATUS OF THE SURGICAL MANAGEMENT OF CHRONIC PANCREATITIS. (Ger.) Mangold, G. (Chirurgische Universitatsklinik, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Z. Gastroenterol.* 15(2):76-88; 1977.

6344 STATISTICAL CONSIDERATIONS ON A SERIES OF 142 OPERATIONS FOR PRIMARY CHRONIC PANCREATITIS. (Fre.) Doutre, L. P.; Perissat, J.; Pernot, F.; Houdelette, P. (Clinique Chirurgicale A, 311, bd du President Wilson, 33200 Bordeaux, France). *Chirurgie* 103(3):169-176; 1977.

6345 SOME ASPECTS OF THE DIAGNOSIS, PROPHYLAXIS, AND TREATMENT OF POSTOPERATIVE PANCREATITIS. (Rus.) Myasnikov, A. D.; Tronnikov, A. T.; Tronnikova, V. I. (Dept. Operative Surgery and Topographic Anatomy, Kursk Medical Inst., Kursk, USSR). *Vestn. Khir.* 118(4):29-32; 1977.

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6346 LIPID ABNORMALITIES AND ACUTE PANCREATITIS. (Eng.) Cameron, J. L. (Dept. Surgery, Johns Hopkins Univ., Baltimore, MD). *Hosp. Prac.* 12(4):95-101; 1977.

6347 DUODENAL NARROWING ASSOCIATED WITH CHRONIC PANCREATITIS. (Eng.) Short, W. F. (Memorial Hosp., North Boulevard and Shaker Rd., Albany, NY 12204). *Am. J. Dig. Dis.* 22(3):241-242; 1977.

6348 PROGNOSTIC SIGNIFICANCE OF HYPERTENSION IN ACUTE PANCREATITIS [Abstract]. (Eng.) Good, L. I.; Long, W. B. (Hosp. Univ. Pennsylvania, Philadelphia, PA 19104). *Gastroenterology* 72(5, Part 2):1064; 1977.

6349 PATHOPHYSIOLOGY OF RUPTURED PSEUDOCYSTS [Abstract]. (Eng.) Bradley, E. L., III (Dept. Surgery, Emory Univ., Atlanta, GA). *Gastroenterology* 72(5, Part 2):1032; 1977.

6350 FEEDING PATIENTS WITH PANCREATIC INSUFFICIENCY [Abstract]. (Eng.) Blackburn, G. L.; Bistrian, B. R.; Falchuk, K.; Trey, C. (New England Deaconess Hosp., Boston, MA). *Gastroenterology* 72(5, Part 2):1171; 1977.

See also, 6239, 6324, 6326, 6450, 6472, 6490, 6499
6505, 6525.

LIVER AND BILIARY TRACT

6351 α-FETOPROTEIN (AFP) IN BENIGN LIVER DISEASE: EVIDENCE THAT NORMAL LIVER REGENERATION DOES NOT INDUCE AFP SYNTHESIS. (Eng.) Alpert, E.; Feller, E. R. (Massachusetts General Hosp., Boston, MA 02114). *Gastroenterology* 74(5, Part 1):856-858; 1978.

To determine whether the normal regenerating liver produces α-fetoprotein (AFP), 100 sera samples, obtained during the early postoperative period from 11 patients after partial hepatectomy, were assayed for AFP. In addition, AFP was measured in the sera of 199 patients with various forms of both benign viral and nonviral inflammation commonly associated with hepatic regeneration. None of the sera from the 11 posthepatectomy patients was AFP-positive by radioimmunoassay, despite clinical and biochemical recovery associated with normal liver regeneration. AFP was elevated in 29% of patients with acute hepatitis, 34% of patients with chronic active hepatitis, and in 75% of patients with massive hepatic necrosis. The mechanism and significance of AFP elevations in some patients with acute and chronic hepatitis is uncertain, but probably does not reflect normal liver regeneration.

6352 ASSESSMENT OF SEVERITY OF HEPATIC FUNCTIONAL IMPAIRMENT. (Eng.) Preisig, R.; Bircher, J.; Paumgartner, G. (Dept. Clinical Pharmacology, Univ. Berne, Murtenstr. 35, CH-3010 Berne, Switzerland). *Rend. Gastroenterol.* 9(3):228-233; 1977.

To improve the measurement of hepatic functional derangement in humans, animal models were investigated prior to human trials, and three techniques (hepatic uptake, metabolism, and excretion) useful for assessing the severity of liver disease in humans are described. Although sophisticated methods to assess hepatic uptake are available for animals, they are not yet applicable in humans. Yet it is possible to estimate an initial hepatic removal rate from the peripheral disappearance rat following different i.v. doses of indocyanine gre by the application of Michaelis-Menten kinetics. When the results obtained in patients with fatty liver or with cirrhosis are compared, the severit of functional impairment is evident from V_{max} and K_m values. Minor degrees of functional derangeme may escape detection with this technique. A brea test was developed to analyze hepatic metabolism by measuring hepatic microsomal function. A sing dose of 4-dimethyl-^{14}C-amino-antipyrine (DAA, 9 m kg p.o.) was given to 20 cirrhotics, and $^{14}CO_2$ was sampled intermittently up to 10 hr following administration. The disappearance rate of $^{14}CO_2$ activity from the breath (K_B) was directly correlated (r=0.90) with the disappearance rate of DAA from the plasma and proportional to the decrease in the galactose elimination capacity (a standard quantitative measure of a specific metabolic func tion), indicating that the breath test yields qua titative information on hepatic metabolic capacit A modification of the breath test uses uniformly labeled galactose instead of DAA. In a re-evalua tion of the BSP-disappearance curve, it was shown that the first exponential component (K_1) is a sensitive index to discriminate between normal subjects and patients with liver disease, and tha the second exponential component (K_2) provides quantitative assessment of excretory function. The quantification of selected metabolic and excretory functions will require additional study to become clinically applicable for the assessme of the severity of hepatic functional derangement

353 THE SELECTED BIOCHEMICAL AND IMMUNOLOGICAL EXAMINATIONS IN CHRONIC LIVER DISEASES
D THEIR RELATIONSHIP TO PATHOANATOMICAL FINDINGS
TAINED BY BIOPSY.

(Eng.) Passati, P.; Horejsi,
; Jezkova, Z.; Fassati, M. (District Medcare Cen-
er, Prague 9, Czechoslovakia). *Tijdschr. Gastro-*
terol. 20(3):177-190; 1977.

correlate biochemical and immunological indica-
rs of liver dysfunction with morphological and
stological changes, 135 patients with chronic
ver disease (≥2 yr duration) underwent liver bi-
sy and were classified according to five morpho-
gical types: steatosis, noncharacteristic histo-
gical findings, chronic hepatitis, liver cir-
osis, and ascitic liver cirrhosis. Of the series
laboratory tests performed, 17 biochemical in-
ces were grouped into six categories displaying
me similarity in feature or mutual dependence
rotein spectrum, turbidity, and flocculation;
sts for cholestasis; tests for liver cell in-
grity; chromosecretion tests; antibody deter-
nation tests; and other laboratory tests) and
aluated in relation to the morphological findings.
P retention and complete chromosecretion BSP
rve were the most specific and sensitive indica-
rs of functional liver damage; in chronic hepa-
tis, cirrhosis, and ascitic cirrhosis, values for
P excretion were 80%, 92%, and 100% greater than
rmal, resp. Damage to the integrity of the liver
ll, especially in chronic hepatitis and cirrhosis,
s reliably indicated by increased γ-glutamyl-
anspeptidase (γ-GTP), SGTP, and SGOT activities.
creased γ-GTP and alkaline phosphatase levels
re also related to biliary lesions. The detection
autoantibodies to liver, gallbladder, and bile
ct antigens, while not indicative of the severity
the lesion, was considered useful as an indicator
previous pathological events in the liver. Bio-
emical tests in conjunction with biopsy may be
lpful for the precise diagnosis of the severity
d character of liver damage and for the selection
d subsequent evaluation of a therapeutic regimen.

354 PLASMA LIPOPROTEIN ALTERATIONS AND MORPHOLOGIC CHANGES WITH LIPID DEPOSITION IN THE
IDNEYS OF PATIENTS WITH HEPATORENAL SYNDROME.

Eng.) Hovig, T.; Blomhoff, J. P.; Holme, R.; Flat-
ark, A.; Gjone, E. (Natl. Hosp. Norway, Oslo 1,
rway). *Lab. Invest.* 38(5):540-549; 1978.

lasma lipoproteins and morphological changes in the
idneys were studied in four patients with advanced
iver disease and progressive renal failure compat-
le with the diagnosis of hepatorenal syndrome.
l four patients had low plasma lecithin:cholester-
l acyltransferase activity, and the concentration
cholesteryl esters was markedly reduced. The
ain lipoprotein classes were abnormal with an in-
reased content of polar lipids. Electron micro-
copy of negatively stained lipoproteins from two
atients revealed large particles with layered mem-
ranes (700-2,000 A in diameter) corresponding to
he large molecular weight fraction of the low den-
ity lipoproteins. These structures were not pre-
ent in the low density lipoproteins from the other two patients. In the renal biopsy from one patient with layered membranes and in the necropsy specimen from the other patient with layered membranes, deposition of osmophilic material was found in the glomeruli (especially located subendothelially), in the basement membrane, and in the mesangial regions. The deposits were similar to those previously described in patients with familial lecithin:cholesterol acyltransferase deficiency and most probably represent cholesterol and phospholipids. It is suggested that the renal deposition of lipid may be related to the large molecular weight low density lipoprotein fraction and that the mechanisms involved in this lipid deposition are similar to those occurring in familial lecithin:cholesterol acyltransferase deficiency.

6355 TRANSVENOUS (TRANSJUGULAR) LIVER BIOPSY: AN EXPERIENCE BASED ON 100 BIOPSIES.

(Eng.) Lebrec, D.; Degott, C.; Rueff, B.; Benhamou, J. P. (Hopital Beaujon, 92110 Clichy, France). *Am. J. Dig. Dis.* 23(4):302-304; 1978.

Experience with transvenous (transjugular) liver biopsy in patients in whom percutaneous needle liver biopsy was contraindicated because of massive ascites and/or bleeding tendency is presented. This method consists of taking a liver specimen through a needle introduced into the liver parenchyma from the lumen of a hepatic vein. This procedure was attempted 104 times in 98 patients. A liver specimen was obtained in 100 of these 104 attempts; the tissue specimens were unfragmented and large enough to allow correct evaluation of liver architecture in 57 biopsies. The procedure was followed by no or only minor complications in all patients except one who suffered a fatal intraperitoneal hemorrhage in relation to perforation of the liver capsule; perforation was due to an excessive front rotation applied to the needle, a maneuver which therefore must be avoided. It is concluded that transvenous liver biopsy is a workable, efficient, and acceptably safe procedure for obtaining liver specimens in patients with massive ascites and/or bleeding tendency.

6356 MODIFICATION OF THE LONGMIRE PROCEDURE.

(Eng.) Cameron, J. L.; Gayler, B. W.; Harrington, D. P. (Johns Hopkins Hosp., Baltimore, MD 21205). *Ann. Surg.* 187(4):379-382; 1978.

Two modifications of the Longmire procedure of intrahepatic cholangiojejunostomy are described, and a successful application is reported. The first modification involves the preoperative placement under fluoroscopic control of a large Teflon catheter in the distal left hepatic duct to facilitate the identification and isolation of the duct at the time of surgery. The second modification is the use of a transhepatic silastic biliary stent positioned by utilizing the Teflon catheter. These modifications make the Longmire procedure technically much easier and should help insure long-term success in both benign and malignant strictures. This procedure was successfully employed in the treatment of a 22-yr-old woman who had developed stricture of the left hepatic duct and multiple adhesions in the porta hepatis following resection of the right hepatic lobe that had been fractured by blunt trauma. The patient is asymptomatic 7 months after surgery.

6357 MESOATRIAL SHUNT: A NEW TREATMENT FOR THE BUDD-CHIARI SYNDROME.

(Eng.) Cameron, J. L.; Maddrey, W. C. (Johns Hopkins Hosp., Baltimore, MD 21205). *Ann. Surg.* 187(4):402-406; 1978.

A new shunt procedure, the mesoatrial shunt, for decompression of the liver is described. A 56-yr-old woman presented with alcoholic cirrhosis and the Budd-Chiari Syndrome. Because of a thrombosed inferior vena cava, none of the standard portal-systemic shunts could be utilized for decompression of the engorged liver. A new shunt constructed by interposing a Dacron® graft between the superior mesenteric vein and the right atrium was performed. Portal pressure was reduced by the shunt from 30 cm of H_2O to 10 cm of H_2O. Patency has been confirmed postoperatively by catheterization and with angiopathy. The patient is asymptomatic with normal liver function tests nine months following the procedure. A surgical approach is outlined for symptomatic patients with the Budd-Chiari Syndrome that could result in improved survival in patients with this entity.

6358 CELL-MEDIATED CYTOTOXICITY IN CHRONIC ACTIVE LIVER DISEASE: A NEW TEST SYSTEM.

(Eng.) Vogten, A. J. M.; Hadzic, N.; Shorter, R. G.; Summerskill, W. H. J.; Taylor, W. F. (Univ. Hosp. Utrecht, Utrecht, Netherlands). *Gastroenterology* 74(5, Part 1):883-889; 1978.

An *in vitro* cytotoxicity system is described for studying patients with chronic active liver disease using as the target cells ^{54}Cr-labeled avian RBC coated with cell membrane lipoprotein extracted from human liver and, as the aggressors, mononuclear cells from peripheral venous blood. The method was tested in patients with liver diseases and in controls. Thirty of 62 patients with chronic active liver disease showed cytotoxicity in this test system as did 5 of 100 apparently healthy controls. In addition, mild cytotoxicity was shown by 2 of 8 patients with the primary biliary cirrhotic syndrome and 2 of 17 persons with other liver diseases. No specific antibody was added to the test system, and the cytotoxicity was inhibited by free lipoprotein, antilipoprotein, and by aggregated immunoglobulin. Cytotoxicity also was abolished by the depletion from the mononuclear cells of cells phagocytic for iron filings. The effect of depletion of these phagocytic cells was not restored by the addition of 2-mercaptoethanol. These findings add further evidence that autoimmune responses to liver tissue occur in many patients with chronic active liver disease and, importantly, also suggest that these may occur in some apparently healthy people.

6359 HEPATOCYTE DAMAGE INDUCED BY LYMPHOCYTES FROM PATIENTS WITH CHRONIC LIVER DISEASES, AS DETECTED BY LDH RELEASE.

(Eng.) Fernandez-Cruz, E.; Escartin, P.; Bootello, A.; Kreisler, M.; Segovia de Arana, J. M. (Scripps Clinic and Res. Foundation, 10666 North Torrey Pines Rd., La Jolla, CA 92037). *Clin. Exp. Immunol.* 31(3):436-442; 1978.

A cytoplasmic enzyme system was used in the study of the *in vitro* cytotoxic activity of human peripheral blood WBC against isolated liver cells in patients with chronic liver diseases. Lymphocytes from nine primary biliary cirrhosis and eight chronic active liver disease patients were shown to have an *in vitro* capacity to induce a cytolytic effect on isolated hepatocytes, as demonstrated by the enhanced release of LDH ($p<0.001$), a cytoplasmic marker enzyme. No significant LDH release was seen with control lymphocytes of 20 normal persons or with lymphocytes from 10 patients with alcoholic cirrhosis. A new, simple, and reproducible cytoplasmic enzyme system for the study of lymphocyte effector functions was demonstrated. These results corroborate, in a different assay system, that lymphocyte-mediated liver cell damage *in vitro* occurs in both primary biliary cirrhosis and chronic active liver disease.

6360 PRIMARY HEPATIC TUMOR.

(Eng.) Alpert, E.; Ferrucci, J.; Athanasoulis, C.; Malt, R. A.; Galdabini, J. (Massachusetts General Hosp., Boston, MA 02114). *Gastroenterology* 74(4):759-769; 1978.

Factors considered in the differential diagnosis of a primary hepatic tumor are discussed by several physicians. The patient was a 25-yr-old woman who had been suffering for 3 months with lower abdomina pain and had a large, hard, right upper quadrant mass. The patient had been taking oral contraceptives for 4 yr and had had a single episode of hepatitis 5 yr before the current illness. The differential diagnoses examined were focal nodular hyperplasia (FNH) and liver cell adenoma (LCA), bot benign tumors, and hepatocellular carcinoma. Neither history nor physical examination were useful in determining the nature of the liver mass. A computed tomographic liver scan using iodinated contrast material suggested that the lesion was not especially well-vascularized. Angiographic findings excluded LCA and indicated that the differential diagnosis involved FNH and hepatocellula carcinoma. On the basis of a high serum concentration of alpha-fetoprotein, which has not been detected in any patient with a benign liver tumor, the diagnosis of hepatocellular carcinoma was made. The diagnosis was confirmed following right hepati lobectomy. This patient is the fifth young person with hepatocellular carcinoma who has either been on birth control pills or has had an abnormality in steroid metabolism, suggesting the involvement of aberrant steroid metabolism in the genesis of these tumors.

6361 HEPATIC TUMORS OF INFANCY AND CHILDHOOD.

(Eng.) de Lorimier, A. A. (Sch. Medicin

niv. California, San Francisco, CA 94143). *Surg.*
lin. North Am. 57(2):443-448; 1977.

rimary tumors of the liver account for 1.5-2.0% of
nildhood cancers. Girls more commonly develop
ocal nodular hyperplasia (female:male, 3.4:1) and
emangioma (2:1), while boys develop hepatoblastoma
nd hepatocarcinoma 1.3 times more often than do
irls. The predominant symptom (in 90%) is an ab-
ominal mass; other complaints include anorexia,
eight loss, abdominal or lower chest pain, and
omiting. Laboratory findings may include anemia,
olycythemia, hyperlipemia, hypercholesterolemia,
levated levels of serum transaminase, alkaline
hosphatase, calcium, globulin, and bilirubin, and
ow serum levels of albumin, and phosphorus. Radio-
ogic studies, liver scan, ultrasonography, and
omputerized axial tomography are useful in evalu-
ting the tumor. Resection of the tumor should be
ttempted if at all possible because this is the
nly chance for cure (60% for hepatoblastoma and
5% for hepatocarcinoma). The tumor is confined to
he right lobe two to three times more often than
o the left. Involvement of both lobes or multi-
entric origin is seen in a third of the patients.
here is no correlation between the size of the mass
nd the prognosis. Operative mortality has been
5-33%, usually due to hemorrhage and transfusion
omplications. In patients in whom the tumor is un-
esectable or in whom there is residual tumor, radio-
herapy and chemotherapy may be beneficial. Re-
ression has been reported following the use of
everal drugs now undergoing clinical trials.

362 HISTOLOGIC AND CYTOLOGIC LIVER CHANGES IN 120 PATIENTS WITH MALIGNANT LYMPHOMAS.

Eng.) Roth, A.; Kolaric, K.; Dominis, M. (Dept.
hemotherapy, Sredisnji Institut za Tumore I Slicne
olesti, Ilica 197, 41000 Zagreb, Yugoslavia).
umori 64(1):45-53; 1978.

he frequency of liver involvement in malignant
ymphomas was determined to assess the value
f liver biopsy in the staging of malignant
ymphomas. Nonspecific liver changes were also
egistered. Percutaneous liver biopsy was per-
ormed in 120 patients with untreated malignant
ymphomas. There were 38 patients with Hodgkin's
isease, 42 with histiocytic lymphomas, and 40
ith lymphocytic lymphomas. All the biopsy spe-
imens were histologically and cytologically ana-
yzed. Positive liver findings (lymphomatous in-
iltration) were observed in 27.5% of patients with
ymphocytic lymphomas, 23.8% with histiocytic
ymphomas, and 7.8% with Hodgkin's disease. Liver
nvolvement in non-Hodgkin's lymphomas was signif-
cantly higher ($p<0.025$) than in Hodgkin's disease.
n the whole group of patients, there were non-
pecific liver changes: chronic persistent hepa-
itis (in 23), aggressive hepatitis (5), liver
teatosis (9), and liver hemosiderosis (4). It is
oncluded that liver involvement with lymphomatous
issue is more common in non-Hodgkin's lymphomas.
nowledge of this is relevant for clinical staging
nd the treatment program. These findings also
onfirm that percutaneous liver biopsy is a valuable diagnostic procedure in the staging of malignant lymphomas.

6363 INCIDENCE AND PATHOPHYSIOLOGY OF PULMONARY EDEMA IN FULMINANT HEPATIC FAILURE. (Eng.)

Trewby, P. N.; Warren, R.; Contini, S.; Crosbie, W. A.; Wilkinson, S. P.; Laws, J. W.; *et al.* (King's Coll. Hosp., Denmark Hill, London, SE5, England). *Gastroenterology* 74(5, Part 1):859-865; 1978.

Since pulmonary edema is common in fulminant hepatic failure, its frequency, its clinical effects, and the results of various treatment measures were analyzed. In addition, the respective roles of heart failure and of cerebral edema in the development of pulmonary edema were investigated. Thirty-seven of 100 consecutive patients with fulminant hepatic failure had clinical and radiological evidence of pulmonary edema. None had clinical evidence of left heart failure, and the pulmonary artery wedge pressure measured in 12 patients was normal. Similarly, there was no evidence to incriminate renal failure, endotoxemia, or hypoalbuminemia. However, there was a significantly higher incidence of pulmonary edema in patients with cerebral edema ($p<0.05$), suggesting either a central origin for the pulmonary edema or common factors predisposing to edema in both sites. An additional local factor may have been the presence of intrapulmonary vasodilatation. Detailed isotope studies in 11 patients showed a significantly increased ($p<0.01$) pulmonary extravascular water volume in the patients with pulmonary edema, which was in keeping with the severity of the radiological changes. Although the overall mortality was higher in those patients with pulmonary edema than in those without, the difference was not significant, and early ventilation with positive and expiratory pressure achieved adequate oxygenation in all but three patients.

6364 HEPATIC-PORTAL VENOUS GAS IN ADULTS: ETIOLOGY, PATHOPHYSIOLOGY AND CLINICAL SIGNIFICANCE. (Eng.)

Liebman, P. R.; Patten, M. T.; Manny, J.; Benfield, J. R.; Hechtman, H. B. (Boston Univ. Medical Center, Boston, MA 02115). *Ann. Surg.* 187(3):281-287; 1978.

The etiology, pathophysiology, and clinical significance of hepatic-portal venous gas (HPVG) in 60 previously reported cases are reviewed, and 4 new cases, occurring in adults, are presented. HPVG appears as a branching radiolucency extending to within 2 cm of the liver capsule. HPVG is associated with necrotic bowel (72%), ulcerative colitis (8%), intra-abdominal abscess (6%), small bowel obstruction (3%), and gastric ulcer (3%). Mucosal damage, bowel distention, and sepsis predispose to HPVG. The current mortality rate of 75% represents an improvement from previous experience. Analysis of survivors indicates that the finding of HPVG requires urgent surgical exploration except when it is observed in patients with stable ulcerative colitis.

6365 EFFECT OF CHENODEOXYCHOLIC ACID ON SERUM AND BILIARY LIPIDS IN PATIENTS WITH HYPERLIPOPROTEINEMIA.

(Eng.) Angelin, B.; Einarsson, K.; Leijd, B. (Karolinska Institutet, Stockholm, Sweden). *Clin. Sci. Mol. Med.* 54(4):451-455; 1978.

To study the effects of chenodeoxycholic acid therapy on serum and biliary lipid levels in hyperlipoproteinemia, chenodeoxycholic acid was administered to seven type IIa, eight type IIb, and eight type IV patients in a daily dose of 750 mg (1.9 mmol) for 3 months. The serum cholesterol and triglyceride concentrations were determined at 4-week intervals; cholesterol remained unchanged, whereas triglycerides decreased 15-20%. In 17 patients, biliary lipids were studied. The proportion of chenodeoxycholic acid in the bile increased from 28.8 ± 1.5 to 72.4 ± 3.6% ($p<0.001$) with reciprocal decreases in cholic and deoxycholic acids ($p<0.001$). Lithocholic acid and ursodeoxycholic acid increased significantly (from 0.2 ± 0.2 to 1.7 ± 0.4%, $p<0.005$ and 0.2 ± 0.2 to 3.2 ± 0.7%, $p<0.001$, resp.). Bile saturation with cholesterol decreased and correlated negatively with the proportion of chenodeoxycholic acid in biliary bile acids ($r=-0.67$, $p<0.001$) but positively with serum triglycerides ($r=+0.48$, $p<0.01$). It is concluded that chenodeoxycholic acid treatment in hyperlipoproteinemia is associated with a parallel fall in serum triglycerides and biliary cholesterol and thus may prove to be a useful adjunct in hypolipemic treatment.

6366 ORAL CONTRACEPTIVES AND FOCAL NODULAR HYPERPLASIA OF THE LIVER: TWO CASE REPORTS WITH ELECTRON-MICROSCOPIC STUDIES.

(Eng.) Balazs, M.; Gergely, R.; Kostic, Sz. (Janos Hosp., Diosarok u. 1, H-1125 Budapest, Hungary). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):111-118; 1978.

Case histories are presented for two women (aged 26 and 36 yr) who had been on oral contraceptives for 2 and 6 yr, resp., and who developed focal nodular hyperplasia of the liver. In both cases, the tumors were discovered as subsidiary findings during cholecystectomy. The diagnosis was confirmed histologically and in one case the tumor was studied electron microscopically. The most outstanding feature of the electron microscopic study was abnormal vascularization. It is hypothesized that abnormal regeneration in the circumscribed areas of the liver is responsible for the disturbed microcirculation. Radical removal of the tumor and discontinuing oral contraceptives are recommended.

6367 JAUNDICE DURING PREGNANCY.

(Fre.) Darnis, F. (Hopital Saint-Antoine, 184, rue du faubourg Saint-Antoine, 75012 Paris, France). *Rev. Prat. (Paris)* 27(53):3683-3692; 1977.

Jaundice during pregnancy is classified into types, normal changes in the liver due to pregnancy are discussed, and three varieties of jaundice in pregnancy (recurring cholestasis, acute liver steatosis, and viral hepatitis) are described. Jaundice occurring during pregnancy may be caused or exacerbated by the pregnancy itself, such as recurring cholestasis or acute liver steatosis, or it may be coincidental, as with viral hepatitis, which causes 70% of all icterus during pregnancy. Cholestasis, which usually recurs with increasing severity durin successive pregnancies, affects women with a genetic predisposition towards cholestasis triggered by the high hormonal levels during the third trimester. Such women should never take oral contraceptives, since these may cause the same problem. The disease is almost always benign in the mother, and the jaundice and pruritus resolve spontaneously after parturition; however, fetal prematurity approaches 50% and fetal mortality is over 15%. Acut hepatic steatosis occurs during the third trimester of the first pregnancy. A severe icterus accompanied by hepatomegaly, hemorrhagic syndrome, and encephalopathies leads almost always to the expulsion of a dead fetus followed in a few days by the death of the mother. Massive doses of tetracycline have been implicated in some cases, but the similarity to Reye's syndrome suggests a genetic deficiency in ornithinetranscarbamylase activity. Viral hepatitis contracted during the first trimester is usually benign to mother and child, but when it occurs during the third trimester it may cause premature births in 50% of cases. The frequency of viral transmission to the fetus is practically nil during the first trimester, 25% during the second, and 80% during the third. Passive immunization of the newborn is recommended when the mother either has hepatitis B (HB) or is a chronic carrier of the HB surface antigen.

6368 HYPERPLASIA AND PROLAPSE OF HEPATOCYTES INTO HEPATIC VEINS DURING LONGTERM METHY TESTOSTERONE THERAPY: POSSIBLE RELATIONSHIPS OF THESE CHANGES TO THE DEVELOPMENT OF PELIOSIS HEPATI AND LIVER TUMOURS.

(Eng.) Paradinas, F. J.; Bull, T. B.; Westaby, D.; Murray-Lyon, I. M. (Charing Cross Hosp. and Medical Sch., London W6, England). *Histopathology* 1(4):225-246; 1977.

The pathological changes in liver biopsies from 10 patients (4 female transexuals and 6 impotent men) after treatment with 150 mg methyltestosterone dail for periods of up to 3 yr are reported; in additio changes in a hemihepatectomy specimen from a femal transexual who developed a liver adenoma after 37 months of this treatment are presented. Hepatocyte hyperplasia and mild focal sinusoidal dilatation was found in most cases. In some cases, there were microcysts and dissociation of hepatocytes. In nine patients, there was accumulation of hepatocytes between the endothelium and the supporting collagen of hepatic vein, which often resulted in either partial occlusion of their lumina or disruption of their walls. These vascular changes do not appear to have been reported before. It is postulated that a single pathological process--hyperplasia, perhaps related to the anabolic effect of methyltestosterone--could be partly responsible both for the formation of cysts through mechanical obstruction of hepatic veins and for the formation of nodules and tumors.

9 ERYTHROPOIETIC PROTOPORPHYRIA: HEPATIC
CIRRHOSIS. (Eng.) Cripps, D. J.; Gold-
b, S. S. (1300 University Ave., Madison, WI
06). *Br. J. Dermatol.* 98(3):349-354; 1978.

er pathology and function were studied in 12
ients with erythropoietic protoporphyria (EPP).
dle liver biopsies in 3 of 11 patients showed
d portal or periportal fibrosis without evidence
abnormal liver function. The 12th patient died
m hepatic cirrhosis and failure at the age of 11
the youngest yet reported. He was not suspected
pending liver disease until 3 months before death.
quantity of protoporphyrin present in his liver
approximately 5.75% of total liver weight.
al liver disease in EPP has occurred in 13 pa-
nts described in the literature, 7 men and 6
en, in which the mean age of death was 38 yr.
seriousness of hepatic complications in EPP
gests that patients with EPP should have reg-
r assessment of hepatic function.

0 WILSON'S DISEASE, PRESENTING AS CHRONIC
ACTIVE HEPATITIS. (Eng.) Scott, J.;
lan, J. L.; Samourian, S.; Sherlock, S. (Royal
e Hosp., London, NW3 2QG, England). *Gastroen-
ology* 74(4):645-651; 1978.

clinical course and prognosis of 17 patients
h Wilson's disease (mean age 12 years) who pre-
ted with clinical, biochemical, and morphological
tures similar to those of chronic active hepa-
is (CAH) are discussed. Neurological dysfunc-
n was evident in only three patients (mean age,
hr); Kayser-Fleischer rings were absent in eight
ients (mean age, 9.5 yr), and the serum cerulo-
smin and copper levels were normal in three pa-
nts with severe hepatic failure. Smooth muscle,
ochondrial, antinuclear, and hepatitis B surface
igen antibodies were negative in all patients.
levels of serum aminotransferases and γ-glo-
ins were elevated in all patients. Cirrhosis
present on initial liver biopsy in 15 patients.
pite D-penicillamine therapy (1.0 to 3.0 g
ly), four patients died within 3 weeks of di-
osis from fulminant hepatic failure associated
h hemolysis. A further five patients died with-
2 yr as a result of hepatic failure (3 patients),
iceal hemorrhage (1), and a lupus-like syndrome
. A sustained improvement was observed in eight
ients who remain well (mean survival time, 7
with near normal liver function tests and inac-
e hepatic histology. Wilson's disease patients
senting as CAH frequently exhibit atypical fea-
es: Kayser-Fleischer rings and neurological
function can be absent and both serum cerulo-
smin and serum copper can be normal especially
there is severe hepatocellular necrosis. As a
ult, diagnosis of Wilson's disease may be de-
ed, and once cirrhosis is established this form
Wilson's disease can have a poor prognosis de-
te D-penicillamine therapy. It is essential,
refore, that the diagnosis of Wilson's disease
excluded in all patients with CAH and chronic
enchymal liver disease of unknown etiology so
t an optimum treatment response to D-penicill-
ne can be achieved.

6371 HEPATIC AND VENA CAVAL INJURIES. (Eng.) Madding, G. F.; Lim, R. C.; Kennedy, P. A. (Sch. Medicine, Univ. California, San Francisco, CA 94143). *Surg. Clin. North Am.* 57(2):275-289; 1977.

The evaluation and treatment of hepatic and vena caval injuries are reviewed. Blunt injuries, as compared to stab or bullet wounds, frequently cause the most serious derangement of liver integrity. The peripheral venous hematocrit and abdominal paracentesis are useful in evaluating acute liver injury, while angiography and liver scans are not. The techniques used in the control of bleeding from liver injuries dictate, to a significant degree, the morbidity and mortality associated with the injury and include the use of gauze packs placed over the site of injury, suturing the individual vessels, resectional debridement, and rarely, sublobar resection. If metal fragments are present and readily accessible, they should be removed; but if extensive surgery would be required, they are best left in place. Subcapsular hematoma, if encountered at surgery, should be opened, followed by control of bleeding points, and removal of any pulpified liver. Retroperitoneal hematomas should be left alone unless expanding or bleeding. In cases where injury to the portal vein cannot be adequately repaired, it may be acutely ligated with safety. Injuries to the intrahepatic portion of the inferior vena cava with extensive liver parenchymal damage and lacerations of the major hepatic veins cause the majority of immediate deaths. Various types of antibiotics are sometimes used as solutions for irrigating the peritoneal cavity before wound closure, and broad-spectrum antibiotics started before or during surgery should be continued postoperatively.

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6413 LOWER AMINES IN BLOOD AND URINE IN CHRONIC DISEASES OF THE LIVER AND KIDNEY. (Ger.)

Martin, R.; Pohl, A.; Rotzsch, W. (Medizinische Klinik der Karl-Marx-Universitat, DDR-701 Leipzig, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37 (2):85-88; 1977.

6414 ROUTINE LONG-TERM INTRAMUSCULAR TREATMENT WITH HEPASTERIL® IN CHRONIC HEPATOPATHY: REPORT ON THERAPEUTIC EXPERIENCE. (Ger.) Laque, R. (Hohenzollernstrasse 77, 6700 Ludwigshafen/Rhei W. Germany). *Therapiewoche* 27(45):8189-8190; 1977.

See also, 5987, 6003, 6047, 6062, 6063, 6079, 6244
6419, 6421, 6448, 6453, 6456, 6463, 6465
6467, 6475, 6476, 6490, 6499, 6500, 6508
6511, 6520, 6524, 6537, 6548, 6553.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

6415 THE ORGANELLE PATHOLOGY AND DEMONSTRATION OF MITOCHONDRIAL SUPEROXIDE DISMUTASE DEFICIENCY IN TWO PATIENTS WITH DUBIN-JOHNSON-SPRINZ SYNDROME. (Eng.) Peters, T. J.; Seymour, C. A. (Royal Postgraduate Medical Sch., Du Cane Rd., London W12 OHS, England). *Clin. Sci. Mol. Med.* 54(5):549-553; 1978.

To discover what, if any, enzyme deficiencies are involved in the Dubin-Johnson-Sprinz syndrome, analytical subcellular fractionation and marker enzyme microassays were used to study hepatic organelle pathology in liver biopsy specimens from two patients with the syndrome and from seven controls. Total (unfractionated) marker enzyme activities were very similar in the patients and controls except for a threefold increase in the activity of the lysosomal enzyme *N*-acetyl-β-glucosaminidase (2.03 ± 0.28 versus 7.55 and 6.64 mU/mg protein in the controls and 2 patients, resp.) and small increases in the activities of the three plasma membrane marker enzymes, alkaline phosphatase, 5'-nucleotidase, and leucyl-2-naphthylamidase (1.35 ± 0.17, 2.55, and 2.89; 13.7 ± 2.4, 18.3, and 20.9; and 1.28 ± 0.17, 3.98, and 3.69 mU/mg protein in the controls and 2 patients, resp., for each enzyme, resp.). When organelle marker enzymes were examined by sucrose density gradient centrifugation for the distribution of particulate enzyme activities, several differences between patients and controls were revealed. The distributions of acid phosphatase and *N*-acetyl-β-glucosaminidase varied between the two groups, with a marked decrease in lysosomal median density in the patients. In the controls, superoxide dismutase activity was largely soluble (remaining in the starting layer) with a distinct particulate peak (5-10% of total activity) at a position corresponding to that of malate dehydrogenase, but this distinct mitochondrial peak was absent in the patients. There was also a marked decrease in the median density of the endoplasmic reticulum marker, neutral α-glucosidase, in the patients. It is hypothesized that superoxide dismutase inhibits the formation of lipid peroxides and thus lipofuscin pigments by preventing the interaction of free O_2^- radicals with fatty acid components of membrane lipids. When lysosomes degrade mitochondria (these organelles have a half-life of 10 days), the accumulated lipofuscin is transferred to the lysosomes where it remains in increasing quantities, being re atively undegradable. The source of the melanin a of the impairment of conjugated bilirubin excretio in Dubin-Johnson-Sprinz syndrome is still not clea

6416 HEREDITARY DISORDERS OF BILIRUBIN METABOLISM. (Spa.) Wolpert, E.; Robles, G.; Suarez de la Torre, G. I.; Lisker, R.; Villarreal, E.; Wolkoff, A. W.; *et al.* (Instituto Nacional de la Nutricion, Viaducto Tlaplan y Av. San Fernando, Mexico 22, DF). *Rev. Invest. Clin. (Mex.)* 30(1): 49-57; 1978.

See also, 5989.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

6417 BOTRYOMYCOSIS AS AN OBSTRUCTIVE HEPATIC DISEASE. (Eng.) Bagby, G. C., Jr.; Gunning, J. J. (Veterans Admin. Hosp., Sam Jackson Park, Portland, OR 97207). *Arch. Intern. Med.* 138 (3):472-473; 1978.

The case of a previously well patient who initiall had apparent hepatitis due to *Pseudomonas aerugino* that spread hematogenously to involve both lungs is presented. The patient, a 20-yr-old man, presented with malaise, anorexia, dark urine, scleral

erus, diarrhea, and mild abdominal pain. The
ient rapidly developed both obstructive biliary
miliary pulmonary disease. Cultures of hepatic
sue grew *Pseudomonas*, but this was thought to
a contaminant. A liver scan showed a filling
ect. *P. aeruginosa* appeared in the sputum and
ne cultures as well as cultured lung tissue.
laparotomy, there was hepatosplenomegaly, small
enteric microabscesses, and small, white nodular,
m lesions beneath the hepatic capsule. All
tures of pus from multiple abscesses and of
atic tissue grew *P. aeruginosa*. The patient re-
nded to drainage of the abscesses and to genta-
in therapy. Twelve months postoperatively, all
er function studies, including liver scans and
i.v. cholangiogram were normal. Although the
sative organism in this case probably arose
m normal intestinal flora, the mode of trans-
sion to the liver is unknown. Nonetheless,
s case exemplifies the previously described
gressive subacute course of disseminated botryo-
osis, the lack of underlying host defense ab-
malities, and the importance of tissue diagnosis
special stains and culture of the involved organs.

8 MASSIVE HEPATIC NECROSIS ASSOCIATED WITH
DANTROLENE THERAPY. (Eng.) Donegan, J.
Donegan, W. L.; Cohen, E. B. (Milwaukee County
eral Hosp., 8700 West Wisconsin Ave., Milwaukee,
53226). *Am. J. Dig. Dis.* 23(Suppl. 5):48S-52S;
8.

case of a 53-yr-old woman who had been treated
the neurological symptoms of multiple sclerosis
4 months with dantrolene (200 mg. q.i.d.), Vis-
il (25 mg, q.i.d.), and Dalmane (30 mg before
iring) and who developed jaundice, ascites,
ressed pulmonary function, and oliguria is pre-
ted. Despite i.v. fluid therapy, diuretics,
ibiotics, parenteral salt-poor albumin, and
amins A, D, and K, the patient's condition de-
ned progressively, and she died in hepatic and
al failure on the 9th hospital day. An autopsy
ealed that the liver architecture was markedly
torted by extensive parenchymal necrosis and
t the reticulin framework was collapsed although
re was little fibrosis. The remaining parenchy-
cells exhibited fine vacuolization, intracellu-
cholestasis, and formation of pseudogranular
uctures, many of which contained bile plugs. A
erate inflammatory infiltrate was present in the
ules, consisting of both lymphocytes and granulo-
es, and the Kupffer cells contained phagocytized
ris. The usual lobular pattern of the liver was
rred. Esophageal varices and 2,700 ml of ascites
e present. The kidneys showed gross and micro-
pic changes compatible with acute tubular necro-
. Although the hepatocellular necrosis was rela-
ely nonspecific, in the absence of other causes
this damage, the authors believe the injury to
e been caused by dantrolene.

9 HOW SAFE IS ISONIAZID? (Eng.) Thompson,
J. E. (Health Commission of New South
Wales, 86-88 George St., Sydney, New South Wales 2000, Australia). *Med. J. Aust.* 1(3):165-169; 1978.

To determine the safety of isoniazid (INH) for the treatment or chemoprophylaxis of tuberculosis in Australian patients, the complications of INH treatment were studied in 1,033 patients who had received INH for at least 18 months with or without other drugs. Hepatitis developed in 25 patients; this was attributed to rifampicin (15 cases), infectious hepatitis (3 cases), INH alone (3 cases), INH possibly exacerbating chronic liver disease (2 cases), and multiple drug treatment (2 cases). Central nervous system disorders (mainly peripheral neuropathy) due to INH occurred in 12 patients, all of whom were over the age of 40 yr. Hypersensitivity to INH developed in 12 patients. When the risk of hepatitis was compared with the risks of developing or dying from tuberculosis, it was found that the benefits of INH chemoprophylaxis outweighed the risks, particularly in patients who were less than 50 yr of age. The findings suggest that, in an Australian population, INH can still be regarded as an extremely safe drug, particularly in nonalcoholic patients, and the safest drug available for the chemoprophylaxis of tuberculosis.

6420 HEPATIC DYSFUNCTION FOLLOWING METHYPRYLON INTOXICATION. (Eng.) Loiudice, T. A.; Buhac, I.; Peng, S. K.; Dillard, P. (Albany Medical Coll., Albany, NY 12208). *Am. J. Dig. Dis.* 23 (Suppl. 5):33S-37S; 1978.

The case history of a 63-yr-old man who developed hepatic dysfunction following methyprylon intoxication is presented. The patient attempted suicide by ingesting 29 capsules (8.7 g) of methyprylon. At the time of admission (5 hr after ingestion), the patient was comatose and responsive only to deep pain. He was treated by gastric lavage and i.v. fluids, began to awaken 4 hr after admission, and became fully awake without signs of physical or neurological deficit after 48 hr. Whereas initial laboratory studies had been normal, studies on the fifth hospital day indicated abnormal liver function (SGOT, 177 mU/ml; alkaline phosphatase, 576 mU/ml; total bilirubin, 1.8 mg/dl; 5'-nucleotidase, 29.3 mU/ml) that persisted 2 weeks. Liver scan was normal. A liver biopsy on the 14th hospital day revealed hydropic swelling of hepatic cells, cellular disarray, disruption of hepatic cords, and the presence of periportal inflammation and regenerating hepatocytes. Evidence of a moderate cholestasis was present, but there was no evidence of centrilobular necrosis. The patient continued his recovery and was discharged 1 month after admission. Although methyprylon must now be added to the list of drugs capable of causing hepatic injury, its wide usage in the treatment of insomnia indicates that this toxicity must be extremely rare.

6421 NON-MECHANICAL HEMORRHAGE IN SEVERE LIVER INJURY. (Eng.) Clagett, G. P.; Olsen,

W. R. (Walter Reed Army Medical Center, Washington, DC 20012). *Ann. Surg.* 187(4):369-374; 1978.

Experience with coagulopathy, or nonmechanical bleeding, associated with severe liver injury is reviewed in an attempt to elucidate its pathogenesis and formulate methods of prevention and treatment. Coagulopathy complicated the operative course of 17 of 33 patients suffering severe liver trauma. The highest incidence of nonmechanical hemorrhage (12/18) occurred in patients undergoing anatomic lobectomy. Serial hemostatic parameters were assessed and thrombocytopenia was the most striking abnormality in patients with nonmechanical hemorrhage. The degree of thrombocytopenia was directly correlated with the number of blood transfusions administered ($r=-0.79$, $p<0.001$). The mean operative blood transfusion requirement was significantly greater in patients with nonmechanical hemorrhage (25.1 ± 2.87 U) than in those without (12.2 ± 1.83 U, $p<0.001$). The bulk of this transfusion was given before the onset of clinically overt coagulopathy. Massive transfusion of stored blood was felt to be the most important factor in causing nonmechanical hemorrhage. Convincing evidence for disseminated intravascular coagulation was lacking, and abnormal fibrinolysis was infrequent and mild when observed. Although uneventful in most, in six patients nonmechanical hemorrhage resulted in excessive blood transfusion, unnecessary operation, or death. Infusions of platelet concentrate, fresh frozen plasma, and fresh blood were used to treat successfully most cases of nonmechanical hemorrhage. In all cases, these components were not started until nonmechanical hemorrhage was clinically apparent. The value of prophylactic use of blood components is stressed. Because of troublesome side-effects associated with the use of prothrombin complex concentrates, these agents are contraindicated in patients with severe liver injury. After receiving concentrates, one patient developed severe hypotension leading to ventricular fibrillation, two developed transient thrombocytopenia, and two others demonstra multiple pulmonary microthrombi at autopsy, a fi ing not observed in autopsied patients not recei the concentrates. Prothrombin concentrates appe to be contraindicated in patients with severe li injury.

6422 LIVER DAMAGE DUE TO ADELPHAN. (Ger.) Enat, R.; Rader, G.; Barzilai, D. (Ram bam Univ. Hosp., Aba Khoushy Sch. Medicine, Haif Israel). *Schweiz. Med. Wochenschr.* 107(19):657-658; 1977.

6423 DIHYDRALAZINE-INDUCED HEPATITIS. (Ger Paumgartner, G. (Institut fur Klinisch Pharmakologie der Universitat, Murtenstrasse 35, CH-3010 Bern, Switzerland). *Schweiz. Med. Woche schr.* 107(19):649-650; 1977.

6424 INTERPLAY OF FACTORS LEADING TO ADVERS DRUG REACTIONS IN THE LIVER, A PERSONA VIEWPOINT. (Eng.) Schaffner, F. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Yale J. Biol. Med.* 50(5):489-495; 1977.

See also, 5967, 6351, 6363, 6397, 6401.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

6425 HEPATITIS A VIRUS INFECTION IN FULMINANT HEPATITIS AND CHRONIC ACTIVE HEPATITIS. (Eng.) Rakela, J.; Redeker, A. G.; Edwards, V. M.; Decker, R.; Overby, L. R.; Mosley, J. W. (Rancho Los Amigos County Hosp. [1100 Bldg.], 7601 E. Imperial Highway, Downey, CA 90242). *Gastroenterology* 74(5, Part 1):879-882; 1978.

Studies were carried out in 72 patients with fulminant hepatitis and 35 with chronic active hepatitis to determine whether hepatitis A virus (HAV) could be implicated in the etiology of these diseases. Among the 42 patients with hepatitis B surface antigen (HBsAg)-negative fulminant disease, seroconversion was detected by immune adherence hemagglutination for antibody to HAV (anti-HAV) in 3 of 10 survivors, as well as an increasing anti-HAV score by immune electron microscopy. In the 32 HBsAg-negative nonsurvivors, 3 patients were found wit anti-HAV detectable by immune electron microscop and radioimmunoassay, but not by immune adherenc hemagglutination. The latter cases were classif as presumptively attributable to HAV. In 10 survivors among 30 HBsAg-positive patients with fulminant disease, no instances of anti-HAV seroconversion were detected. In the 20 HBsAg-positive nonsurvivors, 1 case had anti-HAV detectable by immune electron microscopy and radioimmunoassay not by immune adherence hemagglutination. This case was also considered to be presumptively cau by HAV. Anti-HAV was studied in patients with chronic active hepatitis. The incidence of anti-HAV in 13 HBsAg-positive cases was 31%, which did not differ from the 32% found in 22 HBsAg-negati

ses. There was one seroconversion for anti-HAV
one patient with HBsAg-negative chronic active
atitis, but this appeared to be an epiphenomenon.
al shedding of HAV patients with HBsAg-negative
onic active hepatitis was not present in any of
patients tested. The failure to find HAV in fe-
specimens from patients with chronic active
atitis does not preclude an etiological relation-
p between this agent and chronic disease, but it
resents initial evidence against that hypothesis.
finding that the frequency of anti-HAV is the
e in patients with HBsAg-positive as HBsAg-
ative chronic active hepatitis argues against a
nificant role of HAV in these cases.

26 PREVALENCE OF HEPATITIS A AND B INFECTIONS IN MULTIPLY TRANSFUSED THALASSAEMIC PA-

NTS. (Eng.) Papaevangelou, G.; Frosner, G.;
nomidou, J.; Parcha, S.; Roumeliotou, A. (Athens
. Hygiene, Athens 602, Greece). *Br. Med. J.*
11):689-691; 1978.

lassemia patients who receive regular blood
nsfusions and who live in an area in which hepa-
is is highly endemic were studied to determine
prevalence of hepatitis A virus (HAV) and hepa-
is B virus (HBV) infections in these patients
to evaluate the role of blood transfusions in
atitis A and B transmission. Evidence of HBV
HAV infections was sought in 148 multiply
nsfused patients with homozygous B-thalassemia
in healthy controls (2,040 for HBV and 217 for
). The prevalence of the HBV surface antigen
sAg) or antibody to it (anti-HBs) was signif-
ntly higher (p<0.001) in patients (90.5%) than
controls (17.3%) and it increased with the number
blood transfusions (82.5, 93.5, and 92.5% for
ients with <100, 100-199, and ≥200 transfusions,
p.). In contrast, the prevalence of antibody to
was significantly lower (p<0.001) in patients
n in controls (59.9%) and it decreased with the
ber of blood transfusions (21.0, 15.2, and 8.4%
patients with <100, 100-199, and ≥200 trans-
ions, resp.). Anti-HAV was significantly more
valent (p<0.05) among the controls who were pos-
ve for HBsAg or anti-HBs (28/36) than among pa-
nts who were positive for HBsAg or anti-HBs
/134). These results support the view that blood
nsfusion does not play any appreciable part in
nsmitting HAV. Indeed, regular blood transfusion,
re donors almost all have HAV antibody, seems
give protection against infection.

7 SEROLOGIC AND ANIMAL INOCULATION STUDIES OF A COMMUNAL OUTBREAK OF VIRAL HEPATITIS,

E A. (Eng.) Barker, L. F.; Dienstag, J. L.;
enz, D. E.; Purcell, R. H.; Wong, D. C.; Fein-
ne, S. M.; *et al.* (Div. Blood and Blood Products,
eau Biologics, 8800 Rockville Pike, Bethesda, MD
14). *Am. J. Med. Sci.* 274(3):247-253; 1977.

a from individuals in an outbreak of viral hepa-
is in a multifamily household, probably spread
contaminated food, were studied for antibodies
hepatitis A virus (anti-HAV), and selected acute
phase sera were inoculated into marmosets, to establish the etiology of this outbreak. Testing for anti-HAV was done by the immune adherence hemagglutination (IAHA) method, and the value of this procedure was assessed. Significant rises in anti-HAV titers between acute and convalescent sera occurred in all of 15 individuals in the outbreak who experienced serum enzyme elevations and in 1 of 14 individuals whose serum enzyme levels remained normal. The remaining 13 individuals in the latter group had antibody levels in both early and late sera compatible with residual immunity from prior HAV infections and correlating with resistance to reinfection. Groups of marmosets were infected with acute phase sera from two of the cases; in both instances the inoculated sera contained substantial levels of anti-HAV. The marmosets developed specific anti-HAV seroconversions as well as enzyme elevations. The results are indicative of the value of the IAHA test for establishing the etiologic agent in an outbreak of hepatitis. This study adds intrafamily spread to the already serologically established settings of HAV transmission.

6428 PREVALENCE OF HEPATITIS B IN A HIGH-RISK SETTING: A SEROLOGIC STUDY OF PATIENTS AND STAFF IN A PEDIATRIC ONCOLOGY UNIT.

(Eng.) Tabor, E.; Gerety, R. J.; Mott, M.; Wilbur, J. (Bureau Biologics, Bldg. 29, Rm. 311, 8800 Rockville Pike, Bethesda, MD 20014). *Pediatrics* 61(5): 711-715; 1978.

The prevalence of serologic markers for hepatitis B virus (HBV) was evaluated among 188 patients and 158 employees in a pediatric oncology unit. Evidence of past or present HBV infection was detected in 33 patients and in 25 employees. The prevalence was higher among patients receiving chemotherapy (19%) than among those not receiving chemotherapy (7%). The prevalence of HBV serologic markers, while much higher than generally found among healthy children in the United States, was low compared to previously reported prevalences in such settings, and may reflect the use in recent years of blood and blood products screened by "third generation" methods (radioimmunoassay and reversed passive hemagglutination) for hepatitis B surface antigen and the use of all volunteer blood donors. This prevalence suggests that there may be less urgent need for the use of hepatitis B immune globulin and hepatitis B vaccine (when it becomes available) in oncology units than had been anticipated from earlier data in oncology units.

6429 TRANSMISSION OF HEPATITIS B VIRUS INFECTION BY TRANSFUSION OF FROZEN-DEGLYCEROLIZED RED BLOOD CELLS.

(Eng.) Alter, H. J.; Tabor, E.; Meryman, H. T.; Hoofnagle, J. H.; Kahn, R. A.; Holland, P. V.; *et al.* (Blood Bank Dept., Bldg. 10A/ Rm. 1E33, Clinical Center, NIH, Bethesda MD 20014). *N. Engl. J. Med.* 298(12):637-642; 1978.

Chimpanzees were used to determine the ability of prior freezing of RBC to prevent the transmission of type B post-transfusion hepatitis.

Four units of human whole blood were each inoculated with 10^6 infectious doses of hepatitis B virus. Although all units became hepatitis B surface antigen (HBsAg) negative after freezing and deglycerolization, hepatitis B virus infection developed in all four chimpanzees when these units were transfused. Two of these chimpanzees had only serologic evidence of infection, including the development of HBsAg and antibody to both the hepatitis B surface and core antigens; in these animals, the incubation periods were prolonged (24 to 25 weeks). In contrast, the other two animals also had elevated levels of SGPT (peaks of 190 and 461 IU/l) and had a more rapid onset. There was no hepatitis B virus infection in two nontransfused controls. The results do not support the use of frozen RBC for the prevention of post-transfusion hepatitis. titis.

6430 PREVENTION OF NEONATAL HEPATITIS B INFECTION BY HIGH-DOSE HEPATITIS B IMMUNE GLOBULIN. (Eng.) Dosik, H.; Jhaveri, R. (Jewish Hosp. and Medical Center of Brooklyn, 555 Prospect Pl., Brooklyn, NY 11238). *N. Engl. J. Med.* 298(11):602-603; 1978.

The cases of two infants and their mother, who was a chronic hepatitis B surface antigen (HBsAg) carrier, are presented. The first child, a boy, developed fatal hepatitis at 3 months of age. Postmortem examination revealed that the child was HBsAg-positive, and the mother was discovered to be an asymptomatic HBsAg carrier. In the second child, a girl, HBsAg and antibody to HBsAg were negative on umbilical cord blood and capillary blood taken 2 hr after birth. She was treated with 5 ml of hepatitis B immune globulin on the day of birth and every 5 weeks for 6 months. HBsAg remained negative, and titers of antibody to HBsAg were consistently above 1:100 during treatment. Eight months after the last dose of hepatitis B immune globulin, the child remained antigen-negative and antibody-positive, with a normal growth pattern. The results in this patient and in many patients in the literature suggest that multi-injection therapy with hepatitis B immune globulin is indicated in infants of HBsAg-carrier mothers.

6431 T LYMPHOCYTE-MEDIATED CYTOTOXICITY IN HBsAg-POSITIVE LIVER DISEASE. (Eng.) El Sheikh, N.; Osman, C. G.; Cullens, H.; Eddleston, A. L. W. F.; Williams, R. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London S.E. 5, England). *Clin. Exp. Immunol.* 31(2):158-165; 1978.

Lymphocyte cytotoxicity assays were used to investigate T lymphocyte cytotoxicity in hepatitis B surface antigen (HBsAg)-positive liver disease, using HBsAg-coated RBC as target cells. When lymphocytes from 23 patients with acute hepatitis were tested, cytotoxic T cells were demonstrable during the recovery phase, but not in the first 3 weeks of the illness. However, when these same lymphocytes were extensively washed, cytotoxicity was then detected in all the patients, even at the time of presentation. In patients with HBsAg-positive chronic
liver disease, the results with the standard assa
were largely within the normal range, but, again,
with extensive lymphocyte washing, cytotoxicity w
detected in all of the patients with untreated
chronic active hepatitis and in five of six with
more minor histological lesions. The results in
five carriers with normal liver histology were co
pletely different, cytotoxicity remaining undetec
able even after the extensive washing pocedure.
The results suggest that blocking factors, possib
antigen or antigen-antibody complexes, could be
interfering with the detection of sensitized T ce
in patients with acute and chronic hepatitis but
that there is a true absence of sensitization to
HBsAg in healthy carriers with normal liver histology.

6432 HEPATITIS B SURFACE ANTIGEN IN HUMAN TE
(Eng.) Darrell, R. W.; Jacob, G. B. (E
ward S. Harkness Eye Inst., 635 W. 165th St., New
York, NY 10032). *Arch. Ophthalmol.* 96(4):674-676
1978.

Tears collected from 18 patients with hepatitis B
surface antigen (HBsAg)-positive serum and from 1
controls without HBsAg were tested to determine
whether the antigen can be transmitted via this
blood product. The tears were collected either
with a standard Schirmer test-strip or with a sof
contact lens. HBsAg was present in 10 of the 18
subjects with serum HBsAg. These results demonstrate that there is a risk of transferring hepatitis B virus infection by tonometers or soft con
tact lenses contaminated by HBsAg. Infection fro
body secretions, entry of HBsAg through the conjuctiva, infection among medical personnel, and
techniques of reducing hepatitis B virus infectio
are briefly reviewed.

6433 ANTIBODY TO HEPATITIS B SURFACE ANTIGEN
IN HAEMOPHILIACS ON LONG-TERM THERAPY W
SCOTTISH FACTOR VIII. (Eng.) Burrell, C. J.; Bl
S. H.; Ramsay, D. M. (Edinburgh Medical Sch., Edi
burgh, Scotland). *J. Clin. Pathol.* 31(4):309-312
1978.

Thirty-five patients with hemophilia A were stud
clinically and serologically in 1971-2 and 1975-
for evidence of hepatitis B infection to relate
the findings to the type and frequency of replace
ment factor VIII. One patient had clinical hepatitis B, and a further eight patients showed ant
body responses to hepatitis B surface antigen (H
consistent with exposure to HBsAg during this pe
No evidence for HBsAg exposure was found in 14 p
tients, while the remaining 12 patients had high
titers of antibody to HBsAg at both times so tha
no inferences could be drawn about HBsAg exposur
All patients had received exclusively replacemen
factor VIII material prepared locally from HBsAg
screened voluntary Scottish blood donations. Fr
the details of the therapy given, the rate of HB
seroconversion in these patients was calculated
represent about 0.3 HBsAg-containing donations p

00 donations. The findings should provide both
guide to the likelihood of seroconversion to
i-HBs positivity after factor VIII replacement
m similar defined sources and a basis for com-
rison of this material with commercial factor
I preparations.

4 SUBTYPES OF HBsAg AMONG HEPATITIS PATIENTS.
(Eng.) Ukkonen, P. (Dept. Virology, Univ.
sinki, Helsinki, Finland). *Scand. J. Infect.*
. 10(1):11-14; 1978.

um samples from 94 Finnish hospital patients
h hepatitis B were investigated for subtypes of
atitis B surface antigen (HBsAg), and these sub-
es were correlated with clinical data. The pa-
nts were divided into groups according to whether
y were drug abusers (31%), had some other in-
ased risk of contracting hepatitis (36%), or had
apparent indication of exposure. There were sig-
icant differences between the mean ages of the
ients and the clinical form of the disease as
l as the subtype of HBsAg. Patients with chronic
er disease or subtype *ad* were older than those
h acute hepatitis ($p<0.01$) or subtype *ay*
0.00002), resp. The drug abusers were the
ngest group. Subtype *ay* predominated in pa-
nts with acute hepatitis (77%). All drug
sers had the *ay* subtype. Of 11 patients with
onic liver disease, 10 had the *ad* subtype.
e of seven hepatitis cases associated with blood
nsfusion had subtype *ay*, although this deter-
ant has not been detected among Finnish non-
d blood donors. These results suggest that
od donors who incubate hepatitis B (HBsAg not
detectable) are an important source of trans-
ion hepatitis.

5 DUALITY OF HEPATITIS B e ANTIGEN IN SERUM
OF PERSONS INFECTED WITH HEPATITIS B VI-
: EVIDENCE FOR THE NONIDENTITY OF e ANTIGEN WITH
UNOGLOBULINS. (Eng.) Takahashi, K.; Imai, M.;
akawa, Y.; Iwakiri, S.; Mayumi, M. (Jichi Medi-
Sch., Tochigi-ken 329-04, Japan). *Proc. Natl.
d. Sci. USA* 75(4):1952-1956; 1978.

entitites of hepatitis B e antigen (HBeAg)
ivity physicochemically different from
h other, demonstrated in the sera of per-
s infected with hepatitis B virus, are des-
bed. One was associated with a molecule that
ecipitated in 1.33 M ammonium sulfate solution,

was larger than IgG, had an electrophoretic mobility in the β- to γ-globulin regions, and had an isoelectric point of approximately pH 5.7. In contrast, the other HBeAg activity was associated with a molecule that was soluble in 1.33 M ammonium sulfate solution, was smaller than IgG, and had an electrophoretic mobility in the α-globulin region and an isoelectric point at pH 4.8. In spite of their marked physicochemical differences, a line of antigenic identity was clearly observed for them when they were tested against antibody to HBeAg by a double immunodiffusion method. The HBeAg activity associated with the large molecule was completely removed by an affinity column of anti-IgG, whereas the activity of the small molecule was not. These results indicate that, in the serum, HBeAg exists as a molecule smaller than IgG and also in association with IgG.

6436 HEPATITIS B ANTIGEN--A SURVEY IN A MAJOR METROPOLITAN HOSPITAL. (Eng.) Luey, K. (Bristol Royal Infirmary, Bristol BS2 8HW, England). *Aust. N.Z. J. Med.* 7(4):394-399; 1977.

6437 APPLICATION OF A SCREENING TEST FOR ANTIBODY TO HEPATITIS B CORE ANTIGEN. (Eng.) Cohen, B. J.; Cossart, Y. E. (Central Public Health Lab., Colindale Ave., London NW9 5HT, England). *J. Clin. Pathol.* 30(8):709-713; 1977.

6438 AN ENZYME-LINKED IMMUNOSORBENT-ASSAY TEST FOR HEPATITIS B SURFACE ANTIGEN. (Eng.) Vandervelde, E. M.; Cohen, B. J.; Cossart, Y. E. (Central Public Health Lab., Colindale Ave., London NW9 5HT, England). *J. Clin. Pathol.* 30 (8):714-716; 1977.

6439 BLOOD COAGULATION STUDIES IN PREGNANT PATIENTS WITH INFECTIVE HEPATITIS. (Eng.) Dube, B.; Bhattacharya, S.; Sinha, V. N.; Pandey, L. K.; Dube, R. K. (Inst. Medical Sciences, Banaras Hindu Univ., Varanasi, India). *Br. J. Obstet. Gynecol.* 84(8):592-599; 1977.

See also, 5995, 6329, 6351, 6359, 6362, 6363, 6374, 6379, 6383, 6387, 6397, 6406, 6461, 6462.

LIVER AND BILIARY TRACT

Chronic Hepatitis

0 CHRONIC HEPATITIS: A PROBLEM FOR THE
PATHOLOGIST. (Eng.) Scheuer, P. J. (Roy-
Free Hosp., Pond St., London NW3 2QG, England).
topathology 1(1):5-19; 1977.

histological classification of chronic hepatitis

is reviewed. The accepted histological categories of chronic hepatitis are chronic persistent hepatitis (CPH) and chronic active or aggressive hepatitis (CAH). A third form, chronic lobular hepatitis (CLH), encompasses those cases in which the lesion is predominantly within the lobules and in which portal and periportal inflammation are mild. International agreement on a reproducible and rational nomenclature of chronic hepatitis is still far from complete. CPH is characterized by portal inflammation. This category may need subdivision on the basis of immunological studies. CAH should be regarded as a complex rather than a single disease, and it is important to specify the etiology and pathological components in each instance. The concept of CAH must be altered to incorporate the lesion of bridging hepatic necrosis (BHN). Piecemeal necrosis, accompanied by inflammatory infiltration, is considered to be the most important of the various pathogenetic factors in CAH, but BHN probably plays a significant part in accelerating the development of cirrhosis. An excessive portal and periportal inflammatory reaction, with or without BHN, in a liver biopsy taken during the course of an acute hepatitis helps to predict a possible chronic course.

6441 CHRONIC ACTIVE HEPATITIS IN JERUSALEM: COMPARISON BETWEEN HBsAg-NEGATIVE AND HBsAg-POSITIVE CASES.

(Eng.) Shouval, D.; Penchas, S.; Sandler, S. G.; Mansour, D.; Eliakim, M. (Hadassah Univ. Hosp., Jerusalem, Israel). *Am. J. Gastroenterol.* 69(1):70-80; 1978.

To establish the etiology and the clinical and laboratory characteristics of chronic active hepatitis (CAH), 43 patients with biopsy proven CAH were studied with special reference to the presence or absence of hepatitis B surface antigen (HBsAg). Evidence of hepatitis B virus (HBV) infection (HBsAg and/or antibody to HBsAg [anti-HBs]) was found in 26 cases. Thus, HBV is probably the most important etiologic factor of CAH in the Jerusalem area. Fifteen patients were HBsAg-positive. This group was characterized by a higher frequency of male patients of Sephardic origin, a relatively frequent acute hepatitis-like onset, early presence of cirrhosis and portal hypertension, and relative rarity of skin rashes, thyroid involvement, and cholelithiasis. L.E. cells, cryoglobulin, paraprotein, and positive Kahn-Wassermannn tests were not found, and antimitochondrial antibodies were less common in this HBsAg-positive group. The mean level of serum albumin was lower while IgG and IgA levels were higher. Mortality was 7% during a mean follow-up period of 4.4 yr. The antigen-negative group was characterized by a higher prevalence of women of Ashkenazic origin, insidious onset, and more frequent presence of skin rashes, thyroid disease, and cholelithiasis. Peripheral lymphomonocytosis, high IgM levels, and antimitochrondrial antibodies were also more common. All cases with L.E. cells (mature neutrophilic polymorphonuclear WBC, which has phagocytized a spherical, homogeneous-appearing inclusion), cryoglobulin, paraproteinemia, and positive Kahn-Wassermann tests were in this gorup. Anti-HBs antibodies were present in 42% of the cases. Mortality was 29% during a mean follow-up period of 5.4 yr. Linear discriminant analysis with 10 variables (sex, mode of onset, skin rash, levels of serum albumin, IgA, and IgM, degree of BSP retention, presence of L.E. cells, antimitochondrial antibodies, and positive Kahn-Wassermann tests) classified correctly 100% of 12
cases that fulfilled the necessary criteria. Sex
ethnic origin (Ashkenazic or other), and presence
of thyroid disease classified correctly 85%
of 33 cases, thereby permitting a bedside classification with a high degree of credibility.

6442 LYMPHOCYTE CYTOTOXICITY IN CHRONIC ACTI HEPATITIS: EFFECT OF THERAPY AND CORRE- LATIONS WITH CLINICAL AND HISTOLOGICAL CHANGES.

(Eng.) Cochrane, A. M. G.; Moussouros, A.; Smith
A.; Portmann, B.; Eddleston, A. L. W. F.; William
R. (King's Coll. Hosp. and Medical Sch., Denmark
Hill, London, England). *Gut* 19(4):308-314; 1978.

Lymphocyte cytotoxicity for rabbit hepatocyte cul
tures was studied in patients with hepatitis B su
face antigen (HBsAg)-positive and -negative chron
active hepatitis, before and after immunosuppress
therapy. Before treatment, the cytotoxicity stud
ies in all of 15 patients with HBsAg-positive and
-negative hepatitis showed positive results in al
cases. After immunosuppressive therapy, cytotoxi
ty became negative and remained negative, in four
of nine patients followed serially. In 51 patien
established on therapy for periods from 3 months
to 12 yr, cytotoxicity was negative in 19, and al
patients are currently alive. However, in the re
maining 32 patients in whom cytotoxicity was posi
tive, there have been 11 deaths ($p<0.025$). Cyto-
toxicity remained persistently positive in 12 of
15 patients followed serially, and persistently
negative in 7 of 9. Cytotoxicity showed a signi-
ficant association with histological disease acti
ity ($p<0.0005$), especially with the extent of pie
meal necrosis ($p<0.01$), but not with biochemical
tests of liver function, immunoglobulins, or autc
bodies. The basis of this cytotoxicity test is a
antibody-dependent cell-mediated autoimmune reac-
tion directed against a liver specific protein, a
the results suggest that in some cases immuno-
suppressive therapy is followed by control of thi
reaction. It may be possible to stop therapy in
these patients, but in those in whom the reactior
continues, as shown by continuing cytotoxicity,
the prognosis is not as good, and the use of othe
drug schedules would seem worthy of trial.

6443 ANTIBODY TO HEPATITIS B CORE ANTIGEN I CHRONIC ACTIVE HEPATITIS.

(Eng.) Bor
P.; Coursaget, P.; Goudeau, A.; Degott, C.; Maupa
P.; Benhamou, J. P. (Hopital Beaujon, 92118 Clic
France). *Br. Med. J.* 1(6110):396-397; 1978.

Because it has been previously suggested that an
body to hepatitis B core antigen (anti-HBc) may
more sensitive indicator of hepatitis B virus re
cation than is hepatitis B surface antigen (HBsA
studies were carried out to determine whether so
patients with HBsAg-negative chronic active hepa-
titis have anti-HBc in their serum and thus have
liver disease that could also be the consequence
hepatitis B virus infection. Anti-HBc was detec
in 26 of 65 patients with HBsAg-negative chronic

ve hepatitis. All of 35 HBsAg-positive patients
anti-HBc. In the 26 anti-HBc-positive, HBsAg-
tive patients, the mean age was 15 yr greater
that in the 35 HBsAg-positive, anti-HBc-positive
ents (p<0.001), and there was a higher percent-
of patients with moderately active liver lesions
.01), a greater prevalence of cirrhosis associ-
with chronic active hepatitis (p<0.05), and a
r mean value for SGPT (p<0.001) in the former
p. The results could indicate that the liver
ase in the HBsAg-negative patients is the con-
ence of chronic infection with hepatitis B vi-
or that the two groups represent either two
es of chronic infection with hepatitis B virus
wo types of response to it.

4 CHRONIC ACTIVE HEPATITIS, HAEMOLYTIC
ANAEMIA AND Listeria monocytogenes BAC-
EMIA. (Eng.) Chadwick, R. G.; Graham, J. M.
al Free Hosp., Pond St., London NW3 2QG,
land). *Postgrad. Med. J.* 54(627):55-57; 1978.

case of a patient with transient *Listeria*
cytogenes bacteremia and hemolytic anemia
ciated with chronic active hepatitis is pre-
ed. The patient, a 53-yr-old woman, presented
a 3-week history of jaundice, dark urine,
pale feces. She had been breathless on exer-
and tired for 1 week. The patient was treated
prednisolone (30 mg, reducing to 20 mg/day)
17 months. The hemolytic anemia responded com-
ely, and the serum proteins and liver function
s returned to normal. Eight weeks after pred-
lone was stopped, the patient presented with a
ay history of worsening obstructive jaundice,
exia, night sweats, and fever. A liver biopsy
ed established cirrhosis. Blood cultures pro-
d a growth of *L. monocytogenes* type 1/2, but
he time the organism had been isolated the
fever had settled without antibiotics, and repeat blood cultures were negative. This patient appears to be exceptional in having recovered spontaneously from this type of bacteremia.

6445 HYPERVISCOSITY SYNDROME ATTRIBUTABLE TO HYPERGLOBULINEMIA IN CHRONIC ACTIVE HEPATITIS. (Eng.) Lee, W. M.; Lebwohl, O.; Chien, S. (161 Fort Washington Ave., New York, NY 10032). *Gastroenterology* 74(5, Part 1):918-921; 1978.

The case of an 18-yr-old woman with clinical and histological features of chronic active hepatitis who was noted to have extremely high levels of immunoglobulin (14.6 g/dl) is presented. The hyperglobulinemia was associated with the hyperviscosity syndrome, diffuse coagulation abnormalities, and renal insufficiency in the absence of severe liver disease. Correction of these features occurred with plasmapheresis before corticosteroid therapy was begun. A similar group of persons with very high γ-globulin levels, described previously under the heading of "plasma cell hepatitis," may form a distinct and rare subgroup of chronic active hepatitis patients.

6446 LYMPHOCYTE SUBPOPULATIONS IN CHRONIC LIVER DISEASE. (Eng.) McFarlane, I. G.; Eddleston, A. L. W. F.; Williams, R. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London SE5, England). *Clin. Exp. Immunol.* 30(1):1-3; 1977.

See also, 6351, 6353, 6358, 6362, 6370, 6383, 6406,
6425, 6431, 6448, 6524.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

7 LIVER SIZE AND INDICES OF DRUG METABOLISM
IN ALCOHOLICS. (Eng.) Pirttiaho, H. I.;
aniemi, E. A.; Ahlqvist, J.; Pitkanen, U.; Pel-
en, R. O. (Dept. Internal Medicine, Univ. Oulu,
90220 Oulu 22, Finland). *Eur. J. Clin. Pharmacol.*
1):61-67; 1978.

role of liver size in drug metabolism was inves-
ated in 34 chronic alcoholics and 28 controls by
paring antipyrine half-life with biopsy content,
al amount of hepatic cytochrome P-450 (P-450),
liver weight. Liver weight was significantly
ater in alcoholics than in controls in terms of
h absolute liver weight (g; p<0.001 in cir-
sis and alcoholic hepatitis, p<0.005 in fatty liv-
) and in terms of relative weight (g/kg; p<0.001
cirrhosis, p<0.005 in alcoholic hepatitis, p<0.01
in fatty liver). Alcoholics with normal histology also had heavier livers (p<0.005). Total P-450 was increased and antipyrine half-life was enhanced in alcoholics with normal liver histology (28.11×10^3 nmol and 6.7 hr, resp., p<0.05 in both cases). In subjects with alcoholic hepatitis or cirrhosis, the antipyrine half-life was prolonged (p<0.001) and P-450 was decreased (p<0.01 and p<0.05, resp., for hepatitis and cirrhosis; p<0.001 in both cases when P-450 was expressed as nmol/g). Alcoholics with fatty liver had a reduced P-450 content, but the total amount of P-450 and the antipyrine half-life were normal. The results demonstrate, in alcoholics, that an enlarged liver of normal histological appearance is associated with enhanced drug metabolism. In subjects with fatty liver, the drug metabolizing capacity per unit weight of liver is

often impaired, but the increase in liver size leads to undisturbed total oxidizing capacity and normal *in vivo* metabolism. In alcoholic hepatitis, drug metabolism is impaired in spite of hepatomegaly. In cirrhosis, the enlargement of the liver appears to compensate for the decreased P-450 content, resulting in only slightly decreased total P-450, and the severely impaired *in vivo* drug metabolism may be due to derangement of blood flow.

6448 INFLUENCE OF STEROIDS ON UREA-CYCLE ENZYMES IN CHRONIC HUMAN LIVER DISEASE.

(Eng.) Maier, K. P.; Talke, H.; Heimsoeth, H.; Gerok, W. (Medizinische Universitats-Klinik, Hugstetter Str. 55, D-7800 Freiburg, W. Germany). *Klin. Wochenschr.* 56(6):291-295; 1978.

To determine the effects of steroids on urea cycle enzymes in liver disease, the activities of Krebs-Henseleit enzymes were determined in liver biopsies of normal controls and of patients with alcoholic hepatitis and chronic active hepatitis after prednisone administration. Prednisone was administered for 5 days in decreasing doses (1.5 mg-0.5 mg/kg) to both patients with alcoholic hepatitis and controls. Patients with chronic active hepatitis received 15-20 mg prednisone daily for more than 3 months. In controls prednisone did not influence the activities of Krebs-Henseleit enzymes. In patients with alcoholic hepatitis, most of the urea-cycle enzymes were significantly decreased in activity ($p<0.05$) before treatment when compared with those in controls. After glucocorticoid administration, the enzyme activities remained unchanged. The activities of most of the urea cycle enzymes were significantly ($p<0.05$) decreased in untreated patients with chronic active hepatitis. In some patients, glucocorticoid administration was associated with clinical, biochemical, and histological remission. The activities of the rate-limiting enzymes of the urea cycle, arginosuccinate synthetase and carbamylphosphate synthetase, increased significantly ($p<0.05$) in these patients. By contrast, alterations of enzyme activities were not observed in patients who failed to respond favorably to steroid treatment. The increase in most urea cycle enzymes in patients with successfully treated chronic active hepatitis would indicate a restored capacity of the liver to synthesize urea.

6449 PATHOGENESIS AND EARLY DIAGNOSIS OF ALCOHOLIC LIVER INJURY.

(Eng.) Lieber, C. S. (Veterans Admin. Hosp., Bronx, NY). *N. Engl. J. Med.* 298(16):888-893; 1978.

The pathogenesis of alcoholic liver injury and its early detection are discussed. Experiments with baboons have indicated that cirrhosis can develop after high alcohol consumption even when the diet is adequate, suggesting that alcohol itself, rather than the malnutrition associated with alcoholism, is a cause of liver injury. A test comparing the level of alpha-amino-n-butyric acid, which is elevated in the plasma of alcoholics, to that of leucine and concurrently measuring γ-glutamyltranspeptidase has been useful in detecting active alcoholism. Liver injury occurs and progresses because of the deleterious effects of intracellular protein accumulation, elevated blood acetaldehyde levels, microsomal activation of hepatotoxins, alterations in redox state, and lymphocyte cytotoxicity. The activity of serum glutamic dehydrogenase correlates much better with the degree of liver necrosis and inflammation than does the activity o serum transaminases or γ-glutamyltranspeptidase, probably because of its much higher content in the liver and its selective localization. The presenc of pericentral sclerosis at the fatty liver stage is an indication that the patient is likely to develop cirrhosis. Changes in collagen metabolism also appear to be important in the development of cirrhosis, and agents that interfere with collagen production or secretion may prove to be helpful in alcoholic patients.

6450 ACUTE CHOLESTASIS, HEPATIC FAILURE, AND FATTY LIVER IN THE ALCOHOLIC.

(Eng.) Morgan, M. Y.; Sherlock, S.; Scheuer, P. J. (Royal Free Hosp., Pond St., Hampstead, London, England). *Scand. J. Gastroenterol.* 13(3):299-303; 1978.

Case reports are presented for three alcoholics, of whom died, who presented with acute cholestasi and hepatic failure and who showed predominantly fatty change on liver biopsy. Each patient had drunk 100-375 g ethanol/day for 12-20 yr. All ha neglected their diet for 6 months prior to admission. Liver tests showed values of >50 μM for serum bilirubin, suggesting cholestasis, and at least 30 King-Armstrong U/dl for serum alkaline phosphatase activity; aspartate transaminase valu were elevated, indicating hepatocellular damage. Presenting symptoms such as malaise, anorexia, hepatomegaly, leukocytosis, and cholestasis indicated that the patients were suffering from acu alcoholic hepatitis, however, the classical histological elements of this disease such as centrilobular liver cell swelling, Mallory bodies, foca infiltration by neutrophils, and pericellular fibrosis were not observed. Histological features (at biopsy or autopsy) were similar in all three patients. There was severe fatty change with cholestasis; many centrizonal liver cells contained fine vacuoles in addition to larger fat droplets; portal tracts were enlarged and contained inflammatory cells and proliferated bile ducts; fibrosi extended from the portal tracts into the lobules a variable extent.

6451 VITAMIN-A REVERSAL OF ABNORMAL DARK ADA TATION IN CIRRHOSIS: STUDY OF EFFECTS THE PLASMA RETINOL TRANSPORT SYSTEM.

(Eng.) Russell, R. M.; Morrison, S. A.; Smith, F. R.; Oaks, V.; Carney, E. A. (Veterans Admin. Hosp., 3900 Lo Raven Blvd., Baltimore, MD 21218). *Ann. Intern. Med.* 88(5):622-626; 1978.

Studies were carried out to investigate to what e tent abnormalities of dark adaptation are associated with abnormalities in plasma retinol transpo and whether the supplemental vitamin A-associated reversal of dark adaptation abnormalities is medi

by its effects on the plasma retinol transport
tem. Of 26 patients hospitalized with mild to
erate alcohol-associated cirrhosis, 14 had dark-
ptation abnormalities consistent with marginal
amin A status. The response of dark adaptation
the plasma retinol transport proteins, retinol-
ding protein and prealbumin, was studied in 12
these patients after daily p.o. vitamin A supple-
ts (3,300 μg/day). Vitamin A supplementation
associated with significant ($p<0.05$-0.005) im-
vement in dark adaptation and increased plasma
centrations of retinyl esters ($p<0.005$), retinol
0.005), and retinol-binding protein ($p<0.05$).
s, in patients with cirrhosis and marginal vita-
A status, supplemental vitamin A therapy appears
stimulate retinol-binding protein release from
liver. This enhancement of plasma retinol trans-
t and delivery of retinol to peripheral tissues
h as the retina is one of several factors that
serve to optimize vitamin A nutritional status
patients with cirrhosis.

2 EFFECTIVE 25-HYDROXYLATION OF VITAMIN
D_2 IN ALCOHOLIC CIRRHOSIS. (Eng.)
ner, D. B.; Russell, R. M.; Absood, S.; Connor,
3.; Davis, C.; Martin, L.; *et al.* (Veterans
in. Hosp., 3900 Loch Raven Blvd., Baltimore,
21218). *Gastroenterology* 74(5, Part 1):866-
; 1978.

ause metabolic bone disease is commonly seen
alcoholism and cirrhosis, the prevalence of
serum 25-hydroxy vitamin D (25-OH-D) levels
reduced bone density were studied in severe,
ole alcoholic cirrhosis. Studies were carried
to determine whether any correlation exists
ween low serum 25-OH-D levels and reduced bone
eral content as measured by bone density of the
tal radius. The responses of serum 25-OH-D,
cium, phosphorus, serum immunoreactive para-
roid hormone (IPTH), and bone density to long
n vitamin D_2 treatment were also investigated.
rty-two patients were studied, and low serum
OH-D was found in 14. Among 23 of the 32,
mean bone density of the distal radius was
ow that of normal age and sex-matched Baltimore
, although the reduction in bone density did
correlate with serum levels of 25-OH-D. Thir-
n patients with low serum 25-OH-D levels (i.e.,
ng/ml) were treated with p.o. vitamin D_2,
ch raised their serum 25-OH-D from a mean base-
e value of 7 ± 1 ng/ml to 116 ± 1 ng/ml within
onth. Normal or supranormal levels of 25-OH-D
n persisted throughout the 3- to 6-month treat-
t period. Mean bone density fell after 3
ths of treatment ($p<0.01$), but in those who
pleted 6 months, it rose back to pretreatment
els. During vitamin D therapy, serum calcium
e ($p<0.05$), and serum phosphorus fell ($p<0.05$).
n serum parathyroid hormone levels did not
nge significantly at any time during treatment.
s study demonstrates that patients with severe,
anced alcoholic cirrhosis are capable of forming
OH-D in amounts sufficient to result in meta-
ic activity in bone. Low serum levels of 25-
D in alcoholic cirrhotics cannot be explained
y by defective 25-hydroxylation of vitamin D.

6453 NONALCOHOLIC FATTY LIVER WITH ALCOHOLIC HYALIN AFTER LONG-TERM GLUCOCORTICOID THERAPY. (Eng.) Itoh, S.; Igarashi, M.; Tsukada, Y.; Ichinoe, A. (Chiba Univ. Sch. Medicine, 1-8-1 Inohana, Chiba, Japan). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):415-418; 1977.

The case of a 34-yr-old nonalcoholic woman in whom alcoholic hyalin was found in the liver after long-term glucocorticoid therapy for systemic lupus erythematosus is presented. Hepatocytes including hyalin bodies showed fatty change or vesiculated degeneration. Occasionally, a basophilic substance, which was recognized in the hepatocytes with or without hyalin, was noticed showing features similar to delicate alcoholic hyalin. Alcoholic hyalin occurring in a case of fatty liver following glucocorticoid therapy has not been previously described.

6454 ALCOHOLIC HEPATITIS. (Eng.) Sabesin, S. M.; Hawkins, H. L.; Bertram, P. D.; Mann, J. A.; Peace, R. J. (Univ. Tennessee Center for Health Sciences, 951 Court Ave., Memphis, TN 38163). *Gastroenterology* 74(2):276-286; 1978.

Three case histories are presented to illustrate various clinical and pathological manifestations of acute alcoholic hepatitis, and other aspects of the disease are reviewed. A 32-yr-old man, who was hospitalized four times during a 3.5-yr period and continued to drink heavily between hospitalizations, developed in succession biopsy-proven fatty liver, alcoholic hepatitis, cirrhosis, and hepatocellular necrosis and died from aspiration during an upper gastrointestinal hemorrhage. A 31-yr-old woman was hospitalized with a 3-week history of heavy alcohol consumption and a history of chronic alcoholism. Three complications occurred: daily fever for 1 month, attributed to ongoing hepatocellular necrosis; marked sustained hyperbilirubinemia associated with elevated alkaline phosphatase; and ascites and minimal hypertransaminasemia. This case demonstrates that intense and prolonged cholestasis may occur in acute alcoholic hepatitis and may simulate extrahepatic biliary obstruction. A 40-yr-old man with both chronic and acute alcoholic liver disease died from fulminant hepatic failure on the 7th day of hospitalization. Alcoholic hepatitis and its progression to cirrhosis may be mediated by immune mechanisms. It has been proposed that once hepatotoxicity has been initiated, injury may be perpetuated by the cytotoxic lymphokines elaborated by T-lymphocytes after exposure to alcoholic hyaline or acetaldehyde. Patients with alcoholic hepatitis have characteristic abnormalities in plasma lipoprotein electrophoretic patterns. Severe alcoholic hepatitis with encephalopathy may be helped by high doses of corticosteroids and drugs that inhibit collagen biosynthesis or secretion may help prevent cirrhosis.

6455 DEPRESSED DELAYED CUTANEOUS HYPERSENSITIVITY IN ALCOHOLIC HEPATITIS. (Eng.) Snyder, N.; Bessoff, J.; Dwyer, J. M.; Conn, H.

O. (Univ. Texas Medical Branch, Galveston, TX 77550). *Am. J. Dig. Dis.* 23(4):353-358; 1978.

Because a negative response to intermediate purified protein derivative (PPD) antigen has been observed in alcoholic hepatitis, delayed cutaneous hypersensitivity was studied in 10 patients with severe alcoholic hepatitis, 9 patients with either inactive alcoholic cirrhosis or alcoholic fatty liver, and 10 age-matched controls. The mean response of the alcoholic hepatitis group was significantly less compared with controls for streptokinase-streptodronase (SK-SD, $p<0.001$), mumps ($p<0.001$), trichophyton ($p<0.025$), and *Candida albicans* ($p<0.025$) antigens. Upon clinical recovery, the response of the six surviving patients with alcoholic hepatitis was similar to controls for four of the five antigens tested, and the improvements in response to SK-SD and *Candida albicans* were significant ($p<0.02$ and $p<0.05$, resp.). The mean percentage and absolute numbers of thymus-derived lymphocytes were significantly less in the alcoholic hepatitis group compared with controls ($p<0.05$ and $p<0.025$, resp.). Both the alcoholic hepatitis patients and patients with less advanced alcoholic liver disease had a diminished response to concanavalin A and phytohemagglutinin. This study demonstrates a reversible depression of delayed cutaneous hypersensitivity in alcoholic hepatitis. The authors recommend that skin tests in patients with alcoholic hepatitis be interpreted with this phenomenon in mind.

6456 HEPATIC STEATOSIS IN CHILDREN. (Eng.) Colon, A. R. (Georgetown Univ. Sch. Medicine, Washington, DC). *Am. J. Gastroenterol.* 68(3):260-269; 1977.

Hepatic steatosis in children is reviewed. Childhood hepatic steatosis is a common and generally benign condition that occurs in many pathophysiologic states and is rapidly reversible with correction of the abnormal metabolic state that induced it. The most thoroughly explored pathway of steatosis has been fatty infiltration secondary to ethanol. Another pathway involves decreased apoprotein synthesis. Lipolysis of adipose tissue triglyceride or hydrolysis of lipoprotein and chylomicron triglyceride by extrahepatic lipases can result in hepatic fatty infiltration as can abnormal hormonal states and various nutritional deficiencies. Childhood hepatic steatosis has a variety of causes, including toxic, nutritional, metabolic, inflammatory, and storage factors. Tox causes include aflatoxin, amanitatoxin, ethanol, and poisoning with carbon tetrachloride, arsenic, lead, diethylene glycol, phosphorus, chloroform, and vitamin A. Intestinal by-pass procedures, cystic fibrosis, and kwashiorkor can all produce steatosis as can several nutritional deficiencies. Metabolic causes include galactosemia, the glycogenoses, hyperlipoproteinemia, and several familia metabolic syndromes. Among the inflammatory cause are chronic bowel diseases, and sepsis. Storage abnormalities implicated in steatosis include α-1-antitrypsin deficiency, histiocytosis, and the gangliosidoses. Treatment involves the removal of the responsible toxin, bacterium, or drug, dietary control, or nutritional replacement therapy.

6457 ALCOHOLIC HEPATITIS WITH AND WITHOUT ALCOHOLIC HYALINE. (Eng.) Nakamura, S.; Takezawa, Y.; Sato, T.; Aikawa, T.; Kera, K. (Tohoku Univ. Health Center, Sendai 980, Japan). *Tohoku J. Exp. Med.* 123(4):351-358; 1977.

6458 CONTINUOUS LOW DOSE PERIPHERAL VEIN PITRESSIN INFUSION IN THE CONTROL OF VARICEAL BLEEDING. (Eng.) Rigberg, L. A.; Ufberg, M. H.; Brooks, C. M. (Memorial Hosp., Phoenix, AZ). *Am. J. Gastroenterol.* 68(5):481-484; 1977.

See also, 6244, 6326, 6358, 6359, 6397, 6406, 644
6462.

LIVER AND BILIARY TRACT

Cirrhosis

6459 ALVEOLAR-CAPILLARY OXYGEN DISEQUILIBRIUM IN HEPATIC CIRRHOSIS. (Eng.) Davis, H. H., II; Schwartz, D. J.; Lefrak, S. S.; Susman, N.; Schainker, B. A. (Jewish Hosp. of St. Louis, 216 S. Kingshighway, St. Louis, MO 63110). *Chest* 73 (4):507-511; 1978.

Physiological and pathologic studies were carried out in a 35-yr-old man with cyanosis, clubbing, and cirrhosis to investigate the mechanism for the hypoxemia observed frequently in severe hepatic disease. Pulmonary function was normal except fo a low diffusing capacity and a 28% shunt while th patient was breathing 100% oxygen. A perfusion scan with radioactive ^{99m}technetium-labeled macro aggregated albumin revealed 67% of the labeled macroaggregated albumin in the systemic circulati Postmortem examination demonstrated normal pulmon parenchyma, markedly dilated intraparenchymal cap illaries and arterioles, subpleural angiomata, an

rhosis. No anatomic arteriovenous connections
e demonstrated before or after death. It is
cluded that the arterial hypoxemia of some pa-
nts with hepatic cirrhosis results from dilated
-exchanging blood vessels. These widened ves-
s prevent end pulmonary capillary oxygen tension
m reaching equilibrium with alveolar gas, per-
s because of the widened distance for diffusion.

) ABNORMAL LIPOPROTEINS IN A CASE OF PRIMARY
BILIARY CIRRHOSIS. (Eng.) Etienne, J.;
ler, I.; Ayrault, M.; Cloarec, M.; Polonovski,
Debray, J. (Laboratoire de Biochimie et Clin-
medicale A, CHU Saint-Antoine, Paris, France).
edicine [*Express*] 29(1):33-37; 1978.

serum lipoproteins of a patient with primary
ary cirrhosis were studied during the various
utive stages of the disease. During the pre-
ric period, the serum lipoprotein had the chem-
composition of that found in cholestasis (rich
holesterol and phospholipids); however, the serum
rubin level was normal, and no lipoprotein X
) was detected; there was a normal esterified
otal cholesterol ratio and the α lipoprotein
not decreased, as expected, but increased and
divided into two fractions; immunoelectrophor-
studies of ultracentrifugal fractions showed
lipoprotein with high-density lipoprotein
) immunological properties, but with lower
ities than those of normal HDL. The authors
est that the phospholipid overloading of some
hese HDL in the patient's serum could explain
changes in density. During the icteric period,
patient's serum exhibited characteristics
holestasis, with disappearance of HDL and the
arance of LPX. During the subsequent period,
serum again contained phospholipid rich HDL and
Several LPX with different densities were
d. It seems that, in cholestasis, lipoproteins
rgo modification in which the HDL peptide chains
an important role.

FAMILIAL CLUSTERING AND IMMUNE RESPONSE IN
FAMILY CONTACTS OF PATIENTS WITH HBsAg-
TIVE LIVER CIRRHOSIS. (Eng.) Eliakim, M.;
mski, M.; Sandler, S. G.; Zlotnick, A. (Hadassah
. Hosp., P.O. Box 499, Jerusalem, Israel). *Am.*
ig. Dis. 23(5):407-412; 1978.

lies of 11 patients with hepatitis B surface
gen (HBsAg)-positive cirrhosis were studied to
uate the immunologic correlates and extent of
afamilial HBsAg clustering. Of 76 family con-
s, 12 were identified to be asymptomatic car-
s of HBsAg and 2 were diagnosed as having HBsAg-
tive cirrhosis. The overall HBsAg prevalence
the 76 contacts was 18% and that for all 87
ers studied was 29.0%. Serologic evidence of
titis B virus (HBV) infection (either HBsAg, anti-
or both) was detected in 59% of all family
ers. HBsAg was more prevalent in men (47%) com-
d with women (16%), whereas antibody to HBs
i-HBs) was more prevalent in women (42%) com-
d with men (18%). Evidence of an immunologic
onse in clinically unaffected HBsAg-negative
family contacts consisted of elevated serum IgG levels (mean 1,660 mg/100 ml) and increased prevalence of antismooth muscle and antimitochondrial antibodies (16% and 6%, resp.). The prevalence of one or more autoantibodies in all HBsAg-negative family contacts was 20%, and it was higher in women (25%) than in men (13%). This study demonstrates that HBsAg clustering occurs in families of cirrhotic patients in the Jerusalem area and indicates that HBsAg-negative family contacts may have increased B-cell activity.

6462 ELECTRONEUROGRAPHIC EVIDENCE OF POLYNEUROPATHY IN CHRONIC LIVER DISEASE. (Eng.) Vasilescu, C.; Florescu, A.; Balta, N. (Inst. Neurology and Psychiatry, Sos. Berceni 10--12, C.P. 5880, R-75622 Bucharest, Rumania). *Arch. Psychiatr. Nervenkr.* 225(1):87-96; 1978.

An electroneurographic study of the peripheral nerves was carried out in 25 patients with severe cirrhosis following viral hepatitis to determine whether this type of study would be of value in the early diagnosis of peripheral neuropathy in cirrhosis. There was a slight slowing ($p>0.05$) of motor conduction velocity (CV) and a significant diminution ($p<0.001$) of sensory CV and mixed sensorimotor-evoked potentials, associated with a significant decrease in the amplitude of sensory evoked potentials. The slowing was about equal in the distal (digital) and in the proximal segments of the same nerve. A mixed axonal degeneration and segmental demyelination may explain these findings. The CV measurements proved helpful for an early diagnosis of hepatic polyneuropathy showing subjective symptoms in the subclinical stage.

6463 SPECTRUM OF RENAL TUBULAR DAMAGE IN RENAL FAILURE SECONDARY TO CIRRHOSIS AND FULMINANT HEPATIC FAILURE. (Eng.) Wilkinson, S. P.; Hirst, D.; Day, D. W.; Williams, R. (King's Coll. Hosp. and Medical Sch., London SE5, England). *J. Clin. Pathol.* 31(2):101-107; 1978.

Measurements of urinary lysozyme were used to evaluate renal tubular integrity in 34 patients with cirrhosis or fulminant hepatic failure who had developed renal impairment, and the results were compared with the histological findings and the laboratory tests usually used in the differentiation of functional renal failure from acute tubular necrosis. In 18 of the patients, the lysozyme fractional clearance values were normal (<1%) but in the remaining 16 were increased (ranging up to 78%), supporting previous concepts that renal failure complicating hepatocellular disease may occur both without and with tubular necrosis. The lysozyme values were inversely related to the creatinine clearance (14/15 patients with creatinine/clearance of ≥3 ml/ml had normal lysozyme values, whereas 15/19 with creatinine clearance of <3 ml/min had elevated lysozyme values), suggesting that the development of tubular necrosis may be determined by the level of renal perfusion. The validity of simpler laboratory tests often used to assess renal tubular integrity--namely, the urine sodium concentration, the urine:plasma osmolality ratio, and casts in the urine sediment--was evaluated by comparison with the lysozyme measurements. The urine sodium concentration was of most value (patients with normal lysozyme levels always had <12 mM Na in the urine, but patients with elevated lysozyme levels (with one exception) always had high Na levels, with a maximum of 110 mM) and the findings in the sediment were of no value at all.

6464 RHEUMATIC DISORDERS IN PRIMARY BILIARY CIRRHOSIS. (Eng.) Clarke, A. K.; Galbraith, R. M.; Hamilton, E. B. D.; Williams, R. (Royal Natl. Hosp. Rheumatic Diseases, Upper Borough Walls, Bath BA1 1RL, England). *Ann. Rheum. Dis.* 37(1):42-47; 1978.

Eighty-three patients with primary biliary cirrhosis were investigated to determine the prevalence of rheumatic disorders. Fourteen patients had scleroderma, which tended to be mild, but in several patients it produced severe systemic manifestations. Keratoconjunctivitis sicca occurred in all but one of the patients with scleroderma. The CRST syndrome (calcinosis, Raynaud's phenomenon, sclerodactyly, telangiectasia) was only identified twice. There was an increased incidence of histocompatibility locus antigens A1+B8 in those patients with scleroderma (10/14), compared with that in 89 healthy controls (17%, $p<0.01$). In addition to those with scleroderma, four patients had a destructive arthropathy resembling avascular necrosis. Four patients had an inflammatory arthritis, without specific features, but the frequency was no greater than might be expected in the general population. Both keratoconjunctivitis sicca and scleroderma complicating biliary cirrhosis may be due to an immune response.

6465 INCORPORATION OF RADIOCOPPER INTO CERULOPLASMIN IN NORMAL SUBJECTS AND IN PATIENTS WITH PRIMARY BILIARY CIRRHOSIS AND WILSON'S DISEASE. (Eng.) Vierling, J. M.; Schrager, R.; Rumble, W. F.; Aamodt, R.; Berman, M. D.; Jones, E. A. (Liver Unit, Building 10, Room 4D-52, NIH, Bethesda, MD 20014). *Gastroenterology* 74(4):652-660; 1978.

To investigate whether measurements of the incorporation of radiocopper into ceruloplasmin are of value in distinguishing between different diseases associated with accumulation of copper in the tissues, the kinetics of the incorporation of i.v. or p.o. administered radiocopper into ceruloplasmin were studied in eight normal subjects and in eight patients with hepatic copper overload states (6 with primary biliary cirrhosis and 2 with Wilson's disease). After 0.8 days, the radiocopper content of ceruloplasmin in serum was negligible in the patients with Wilson's disease, whereas it was appreciable in the remaining subjects. Total incorporation of radiocopper into ceruloplasmin was calculated by deconvoluting plasma curves of radiocopper in ceruloplasmin with the plasma disappearance curve of i.v. administered radioiodinated
ceruloplasmin, and integrating the derived functi
In normal subjects, incorporation of radiocopper
into ceruloplasmin was reduced by approximately 5
when the isotope was given p.o. rather than i.v.
Plots of the curves of total incorporation of rad
copper into ceruloplasmin against time revealed
components that were approximately linear betwee
2 and 7 days. Extrapolation of these components
to zero time yielded positive intercepts with the
ordinate, which were relatively smaller in the
patients with primary biliary cirrhosis than in
the normal subjects. It is concluded that: (1)
measurements of incorporation of radiocopper int
ceruloplasmin can be used to distinguish between
two hepatic copper overload states; (2) approximately 50% of p.o. administered radiocopper is n
absorbed; (3) copper is incorporated into ceruloplasmin by at least two different pathways, a
slower route that probably involves initial equi
ibration with a hepatic storage pool, and a more
rapid route that presumably bypasses this pool;
and (4) incorporation of radiocopper into ceruloplasmin via the more rapid pathway is impaired i
primary biliary cirrhosis.

6466 NEOMYCIN-SORBITOL AND LACTULOSE IN THE
TREATMENT OF ACUTE PORTAL-SYSTEMIC ENCEPHALOPATHY: A CONTROLLED, DOUBLE-BLIND CLINIC
TRIAL. (Eng.) Atterbury, C. E.; Maddrey, W. C.
Conn, H. O. (Veterans Admin. Hosp., West Spring
West Haven, CT 06516). *Am. J. Dig. Dis.* 23(5):3
406; 1978.

In a double-blind, randomized study, the efficac
of lactulose was compared with that of Neomycin-
bitol in the treatment of 45 episodes of acute
genous portal systemic encephalopathy (PSE) ind
by dietary protein, azotemia, or gastrointestin
hemorrhage. All 35 patients had underlying cirrhosis and, at the time of randomization, had e
cephalopathy of at least grade 2 severity and a
terial ammonia concentrations greater than 150
100 ml. Two-thirds of the patients in each gro
returned to normal mental status, and more than
in each group showed an improvement of at least
grade in mental state. In addition, there was
equivalent improvement in asterixis, in the per
ance of the Number Connection Test, in the elec
encephalographic pattern, and in arterial ammon
concentration. The principal difference betwee
the two groups was a greater reduction in stool
after lactulose therapy (from 7.0 to 5.5 after
apy, $p<0.001$) than after neomycin-sorbitol ther
(from 7.0 to 6.5, $p<0.01$). One patient random
to neomycin-sorbitol had to be withdrawn from t
study because of persistent vomiting related to
administration of the medication. Otherwise, t
were no complications attributable to therapy i
either group. These data suggest that neomycin-
sorbitol and lactulose are equally effective in
treatment of acute nitrogenous portal systemic
cephalopathy.

6467 PORTAL HYPERTENSION. (Eng.) McDerm
W. V., Jr. (New England Deaconess Ho

ston, MA 02215). *Surg. Clin. North Am.* 57(2):
5-396; 1977.

68 THE MANAGEMENT OF PORTAL HYPERTENSION AND BLEEDING OESOPHAGEAL VARICES. (Eng.)

Shields, R. (Royal Infirmary, Liverpool, England). *J. Appl. Med.* 3(8):821-830; 1977.

See also, 6003, 6351, 6353, 6358, 6359, 6369, 6394, 6397, 6400, 6401, 6404, 6406, 6446, 6544, 6553.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

59 EFFECT OF IOGLYCAMIDE (BILIGRAM) ON BILE FLOW AND BILIARY LIPID SECRETION IN MAN.
g.) Bell, G. D.; Doran, J.; Fayadh, M.; Murphy,
Dowling, R. H. (City Hosp., Nottingham, England).
: 19(4):300-307; 1978.

e effect of ioglycamide on bile flow and biliary
id output was studied in man. Twenty-one anic-
ic patients with a t-tube *in situ* were studied
ween the 9th and 11th postoperative days; 11
ients were given an i.v. infusion of ioglycamide
mg/kg/min for 2 hr in 5 patients and 4 mg/kg/min
1 hr plus 1 mg/kg/min for 30 min in 6 patients),
the other 10 acted as controls. Bile flow
recorded, and the biliary concentrations of
lycamide, bile salt, phospholipid, and choles-
ol were estimated in the two groups. The bili-
excretion of ioglycamide was associated with
ignificant choleresis ($p<0.001$ or $p<0.01$), which
probably due to the obligatory coupling of the
otically active contrast agent molecules with
er. Biliary ioglycamide excretion did not sig-
icantly alter bile salt secretion rates. In
trast, the biliary secretion of both phospho-
id and cholesterol was significantly lowered
0.001). Unlike chenodeoxycholic acid, ioglyca-
e significantly reduced bile acid independent
lesterol secretion ($p<0.01$), although secretion
e in terms of micromoles of cholesterol per
romoles of bile acid was essentially unchanged.
se studies show that the biliary excretion of
lycamide is associated with a significant chole-
is that is independent of bile salt secretion.
authors conclude that ioglycamide might prove
be a prototype for the future development of an
lly-administered drug for dissolving cholesterol
lstones.

0 VALUE OF THE CHIBA NEEDLE IN THE TECHNIQUE OF PERCUTANEOUS TRANSHEPATIC CHOLANGIO-
PHY: A REPORT OF 20 CASES. (Fre.) Grenier, P.;
ault, M. J.; Brault, B.; Nahum, H. (Hopital Beau-
, 100, boulevard du General Leclerc, F 92110
chy, France). *J. Radiol. Electrol. Med. Nucl.*
10):659-663; 1977.

Chiba needle, much finer and more flexible than
ventional ones, was used for percutaneous transhepatic cholangiography in 20 patients with cholestasis. Opacification of the biliary canals was possible in 15/16 patients with dilated bile ducts and in 4/4 patients with undilated ducts. In seven cases, incomplete opacification occurred, especially of canals on the left side (the puncture usually centers on the right side of the liver); the gallbladder was badly opacified in seven cases and there was no duodenal passage in four cases. It appears more difficult to aspirate bile during this procedure than with the use of larger diameter needles, which accounts for the problems of opacification. There were nine intraparenchymatous injections (which interfered with the examination twice), four subcapsular injections, and a periportal injection which necessitated interruption of the procedure. No infectious complications occurred (the risk of biliary peritonitis is only 0.64%). Surgery is not imperative after this technique and may be deferred if necessary. The success in catheterizing undilated biliary canals makes this a valuable procedure in cases of prolonged hepatitis or anicteric cholestasis.

6471 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY AND NEEDLE BIOPSY IN THE DIFFERENTIAL DIAGNOSIS OF OBSTRUCTION OF BILE FLOW. (Eng.) Wessely, Z.; Chawla, S. K.; Klavins, J. V. (Queens Hosp. Center, 82-68 164th St., Jamaica, NY 11432). *Am. J. Gastroenterol.* 68(6):582-594; 1977.

Twenty-four patients with clinical evidence of obstructive jaundice were examined by percutaneous transhepatic cholangiography (PTC) and needle biopsy (NB) of the liver to evaluate the combined application of these techniques in the diagnosis of liver diseases. The presence of extrahepatic bile duct obstruction was confirmed by surgery in 21 cases. PTC and the combination of both methods were superior to NB alone in the differential diagnosis between extra- and intra-hepatic biliary obstruction. Sampling bias added to the difficulties of NB in distinguishing between these two types of obstruction. The combination of both procedures proved most useful in three cases with intrahepatic obstruction, in which the patients were spared unnecessary surgery. In five cases, the NB provided additional information about the nature of the tumor metastases and gave support to the clinicians in their therapeutic approach. A combination of PTC and NB increases diagnostic accuracy markedly, and a negative finding by both techniques should eliminate unnecessary surgery.

6472 ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY: EVALUATION BASED ON EXPERIENCE WITH 805 EXAMINATIONS.

(Eng.) Seifert, E. (Staedt Krankenhaus Kemperhof, Koblenzerstr. 115, 5400 Koblenz, W. Germany). *Am. J. Gastroenterol.* 68(6): 542-549; 1977.

Endoscopic retrograde cholangiopancreatography (ERCP) was evaluated on the basis of 805 examinations. Visualization of the common bile duct and the pancreatic duct was possible in 44%, of the common bile duct in 22%, and of the pancreatic duct alone in 24.6% of the cases. The ductal systems were not opacified in 9.4%, but the failure rate decreased from 18.2% to 5.4% within increasing experience. Pathological changes were found in both ducts in 2%, in the common bile duct in 42.2%, and the pancreatic duct in 11.4% of the cases. Diagnostic information was supplied by ERCP in 84.4% of the cases. Complications developed in four cases (acute pancreatitis in 3 and cholangitis in 1). There was no mortality in the entire series. It is concluded that ERCP is a valuable diagnostic method that is frequently successful and reasonably safe.

6473 PERCUTANEOUS TRANSHEPATIC DRAINAGE CATHETER: A VALUABLE THERAPEUTIC AID IN OBSTRUCTIVE JAUNDICE.

(Eng.) Probst, P.; Castenada-Zuniga, W. R.; Amplatz, K. (Univ. Minnesota Hosp., 420 Delaware St. S.E., Minneapolis, MN 55455). *Fortschr. Geb. Rontgenstr. Nuklearmed.* 128(4):443-445; 1978.

The case of a 64-yr-old woman in whom the operative diagnosis of sclerosing cholangitis was made is presented. Following the right nephrectomy and cholecystostomy during which fibrosis, chronic inflammation, and common bile duct tumor were found, bile abscess and intra-abdominal sepsis developed but responded to antibiotics. The patient was discharged but was later readmitted for increasing jaundice; her bilirubin was 11.7 mg/dl. A transhepatic cholangiogram revealed obstruction of the right main bile duct in the porta hepatis. Percutaneous drainage of the biliary system was undertaken; the average daily drainage was 400-700 cm^3. After discharge, the patient was treated by replacement of bile salts and sodium; her bilirubin fell to 6.5 mg/dl after 1 week, to 2.7 mg/dl after 3 weeks, and to normal after 1 month. The transhepatic catheter continued to drain for 3 months, and the cholecystostomy tube began to drain bile as well. A choledochojejunostomy is planned. The main indications for percutaneous decompression of the biliary system are preoperative decompression and primary decompression in patients with obstructive neoplastic disease. The catheter should be advanced under fluorescopic control into one of the major radicles or preferably into the distal common bile duct beyond the point of obstruction.

6474 HEPATO-BILIARY SCINTIGRAPHY AND HEPATOGRAPHY WITH Tc-99m DIETHYL-ACETANILIDO-IMINODIACETATE IN OBSTRUCTIVE JAUNDICE.

(Eng.) Nielsen, S. P.; Trap-Jensen, J.; Lindenberg, J.; Nielsen, L. M. (Frederiksberg Hosp., DK-2000 Copen-
hagen F, Denmark). *J. Nucl. Med.* 19(5):452-457; 1978.

To determine whether serial hepatobiliary scintigraphy can be transformed into a quantitative excretory liver function test and if patients with
significant obstruction of the common bile duct c
be investigated by this method, ^{99m}Tc-diethyl-acetanilido-iminodiacetate (^{99m}Tc-diethyl-IDA) wa
used for combined serial hepatobiliary scintigrap
and processing of hepatographic curves; a scintil
tion camera and an image-processing system were u
in 7 normal subjects and 34 patients with common
bile duct obstruction. In normal fasting subject
and patients with moderate biliary obstruction, t
liver was seen at 1-3 min after i.v. injection, a
reached maximum intensity at 10 min. In patients
with moderately elevated levels of serum bilirubi
and alkaline phosphatase, sufficient anatomical i
formation was obtained by serial hepatobiliary
scintigraphy for 30 min. Complete obstruction wa
diagnosed by the absence of intestinal radioactiv
24 hr after injection. Hepatograms from an area
interest corresponding to the periphery of the ri
liver lobe varied predictably with changes in the
serum levels of alkaline phosphatase and bilirubi
In normal subjects, the time-activity curve in th
area had a maximum of about 10 min. Both anatomi
and functional information was obtained. The investigation could be carried out even under reduc
liver function. Hepatic uptake of the agent was
noted at serum alkaline phosphatase levels up to
1,000 U/1 and serum bilirubin levels up to 170 μ
Although the anatomical information derived from
^{99m}Tc-diethyl-IDA cholescintigraphy is less detailed than that of radiologic methods, this tec
nique can become a valuable diagnostic aid in
cases of obstruction so severe that radiologic c
trast methods are useless or if the patient is
sensitive to contrast media.

6475 SERUM BILE ACIDS AS RELATED TO BILE AC
SECRETION IN LIVER DISEASE.

(Eng.) S
fer, E. A.; Gordon, E. R. (Gastrointestinal Res.
Unit, Univ. Calgary, Calgary T2N 1N4, Alberta, C
ada). *Am. J. Dig. Dis.* 23(5):392-397; 1978.

The level of serum bile acids and their rate of
cretion into the duodenum were measured in norma
subjects and patients with cholesterol gallstone
and hepatobiliary disease to determine if change
in serum bile acids reflect alterations in bile
secretion within the enterohepatic circulation,
pecially in association with disordered bile ac
metabolism and liver dysfunction. To quantitate
bile acid secretion, an intestinal marker perfus
technique was used that measured duodenal outpu
under stimulated but steady-state conditions. I

these perfusion studies, serum bile acids were
rmined at hourly intervals. In the 28 normal
ects, serum bile acids during fasting were low
± 0.7 µM) with only a modest rise occurring
r a fat meal (7.6 ± 0.7 µM). The average bile
secretion rate in these subjects was 1,321
/hr, and little fluctuation was noted in the
m levels (7.5 ± 0.8 µM) during the perfusion
ies. The five patients with cholesterol gall-
es demonstrated a decreased rate of bile acid
etion at 714 µmol/hr ($p<0.05$) but had normal
m values. In 15 gallstone patients who had
rgone cholecystectomy, the bile acid secretion
increased to 1,411 ± 103 µmol/hr without any
esponding change in serum levels. In 19 pa-
ts with liver disease, however, serum bile
s were elevated ($p<0.05$) while bile acid secre-
was reduced ($p<0.05$). Thus, in normal sub-
s, the liver is capable of handling an increased
genous bile acid return with only a small rise
erum levels. In liver disease, bile acid secre-
is reduced while serum concentrations are in-
sed, implying a defect in bile acid handling by
liver. In cholesterol gallstone disease, serum
ls do not reflect the abnormality in bile acid
bolism. The relation between bile acid concen-
ion in the serum and secretion rate into the en-
hepatic circulation is dependent on whether hepa-
dysfunction is present or if bile acid metabolism
bnormal.

BILIARY BILE ACIDS IN UNCOMPLICATED PREGNANCY AND IN CHOLESTASIS OF PREGNANCY.

) Laatikainen, T.; Lehtonen, P.; Hesso, A.
. Central Hosp., Haartmaninkatu 2, SF-00290
nki 29, Finland). *Clin. Chim. Acta* 85(2):
50; 1978.

salt metabolism of conjugated and sulfated bile
was studied in gallbladder bile samples from
pregnant women at term and from two patients
cholestasis of pregnancy by gas-liquid and high-
ure liquid chromatography. In healthy preg-
women, the mean ratio of cholyl/chenodeoxy-
l/deoxycholyl glycine was 3.7:1.0:0.23 and
of the taurine conjugates 3.0:1:0.25, resp.
e gallbladder bile pool of nonpregnant women,
ratios were 1.0:1:0.99 and 1.0:1:0.70, resp.
cholic acid predominated in pregnancy bile.
tients with cholestasis of pregnancy, cholic
comprised 90% of total biliary bile acids,
roportion of chenodeoxycholic acid was greatly
ased, and nonsulfated deoxycholic acid was not
ted. The proportion of sulfated bile acids in
biliary bile acids was between 0.4 and 1.2%
complicated pregnancy and 0.3 and 0.5% in pa-
s with cholestasis. The results suggest that
is a shift to a more extensive biliary ex-
on of taurine as compared to glycine conju-
of bile acids during pregnancy.

LECITHIN-CHOLESTEROL ACYLTRANSFERASE AND THE LIPOPROTEIN ABNORMALITIES OF OBSTRUC-
JAUNDICE. (Eng.) Agorastos, J.; Fox, C.;
, D. S.; McIntyre, N. (Royal Free Hosp., Pond
St., London NW3 2QG, England). *Clin. Sci. Mol. Med.* 54(4):369-379; 1978.

Plasma lipoprotein abnormalities were studied in 16 patients with obstructive jaundice to test the hypothesis that the abnormalities correlate with plasma lecithin-cholesterol acyltransferase activity. Very low-density lipoproteins (VLDL) were normal in composition and had a normal pre-β electrophoretic mobility when lecithin-cholesterol acyltransferase activity was high. When it was low, VLDL had abnormal composition and ran in the β position. With high lecithin-cholesterol acyltransferase activity, low-density lipoprotein (LDL) was normal, and cholestatic LDL (LP-X) was not found. With low lecithin-cholesterol acyltransferase activity, up to three LDL fractions were found: (a) large triglyceride-rich particles, (b) LP-X, and (c) a triglyceride-rich cholesteryl ester-poor particle of normal dimensions. High-density lipoprotein (HDL) concentrations correlated with lecithin-cholesterol acyltransferase activity, and HDL were normal ultrastructurally and in composition when the activity was high. When lecithin-cholesterol acyltransferase activity was low, HDL was abnormal in composition, and "stacked discs," together with normal spherical particles, were seen ultrastructurally. These results suggest that low lecithin-cholesterol acyltransferase activity may cause at least some of the lipoprotein changes of obstructive jaundice.

6478 LYSOSOMAL DEGRADATION OF BILE DEPOSITS IN CHOLESTASIS: AN ULTRASTRUCTURAL AND CYTOCHEMICAL STUDY.

(Eng.) Faria, V. (Medical Sch., Univ. Oporto, Oporto, Portugal). *Virchows Arch. [Cell Pathol.]* 24(4):355-358; 1977.

To elucidate the intracellular fate of hepatocytic bile deposits in cholestasis, liver biopsy specimens obtained at laparotomy from six patients with obstructive jaundice were examined by light and electron microscopy. Membranous and lamellar structures of variable electron density incorporated into vacuoles of different sizes were seen in many hepatocytes. These structures had the characteristic appearances of bile deposits and contained acid phosphatase activity as judged by the deposition of lead phosphate reaction product. The size and intensity of the deposits varied among vacuoles. These results provide additional evidence to support the hypothesis that lysosomes participate in the elimination of retained bile from hepatocytes. It is probable that lysosomal degradation is an important mechanism of intracellular elimination of deposited bile.

6479 CALCIFIED GALLBLADDER (PORCELAIN GALLBLADDER).

(Eng.) Ashur, H.; Siegal, B.; Oland, Y.; Adam, Y. G. (Asaf Harofe Hosp., Tel-Aviv Univ., Zerifin, Israel). *Arch. Surg.* 113(5):594-596; 1978.

The cases of five patients with calcified ("porcelain") gallbladder are presented. The disease appeared mostly in the sixth decade of life (the patients were 62, 61, 41, 75, and 75 yr old) and was more prevalent in women (4/5 patients). The presenting symptoms included abdominal or retrosternal pain in all patients and vomiting or diarrhea in some. Gallbladder calcification was observed by a simple flat plate of the abdomen in four cases, and the remaining case was diagnosed at surgery. Oral cholecystography or i.v. cholangiography showed a nonopacified gallbladder in all cases examined and a narrowed common duct in two. Calcification was associated with gallstones in four cases and with a poorly differentiated adenocarcinoma in the fifth. The findings in these patients and those reported in the literature indicate that surgery should not be delayed even if the patient is asymptomatic, since the occurrence of carcinoma in porcelain gallbladder is remarkably high. The diagnostic work-up should include other roentgenographic examinations in addition to the flat abdominal plate, to exclude calcification of other viscera or the thoracic wall.

6480 THE CLINICAL SIGNIFICANCE OF GALLSTONES AND THEIR RADIOLOGICAL INVESTIGATION.

(Eng.) Earlam, R. J.; Thomas, M. (London Hosp., London, England). *Br. J. Surg.* 65(3):164-167; 1978.

To analyze the clinical symptoms of gallstones and to correlate them with findings from radiological investigations, 122 patients (98 women and 24 men) with gallstones were examined. No specific indigestion was present that could be termed "flatulent dyspepsia." Sensitivity to fatty foods occurred in 69%, heartburn in 42%, regurgitation of acid-tasting or bitter fluid to the mouth in 31%, and increased passage of flatus from the stomach upwards in 38%. If the gallbladder concentrated contrast medium on a p.o. cholecystogram but did not contract after a fatty meal, the patients suffered less heartburn than if the gallbladder functioned normally. The cholecystogram was performed in 111 patients and revealed 60 multiple stones (>10) and 36 solitary stones. However, since surgeons rarely perform a cholecystectomy for flatulent dyspepsia alone, knowledge of gallbladder function may be necessary.

6481 'POLYMER PIGMENTS' IN HUMAN PIGMENT GALLSTONES.

(Eng.) Wosiewitz, U.; Schroebler, S. (Inst. Medical Physics Univ., D-4400 Munster, W. Germany). *Naturwissenschaften* 65(3):162-163; 1978.

To examine whether the black "polymer pigment" in human pigment gallbladder stones is polymerized from bile pigments with a tetra- or with a dipyrrolic structure, gallbladder bile samples obtained by intraoperative puncture from patients who underwent cholecystectomy for pigment cholelithiasis were tested for dipyrrolic compounds by the Stokvis reaction. The black polymer pigment was separated by extraction from the soluble bile pigments, subjected to chromate degradation (oxidation), and analyzed by thin-layer chromatography (TLC). For comparison, biliverdin, urobilin, polymerized propentdyopent, and fecal pigment ("mesobilifuscin") methylesters were also chromate degraded and analyzed by TLC. Bile pigments with a tetrapyrrolic structure (biliverdin and urobilin methylesters) were oxidized to both maleimides and pyrrole dialdehyde The black polymer pigment also gave this pattern. Polymerized propentdyopent and mesobilifuscin methylesters, both polymerized from dipyrrolic monomers, did not yield pyrrole dialdehydes. The results cannot exclude that dipyrrolic polymers are involved in the formation of the black polymer pigment, but it is not composed entirely of such derivatives. It is concluded that the black polymer pigment of human pigment gallstones is based chiefly on the polymerization of tetrapyrrolic bil pigments.

6482 GALLSTONE DISSOLUTION BY CHENODEOXYCHOL ACID AND PHENOBARBITAL.

(Eng.) Marks, W.; Sherman, J. H.; Bonorris, G. G.; Chung, A.; Coyne, M. J.; Schoenfield, L. J. (Cedars-Sinai Medical Center, 8700 Beverly Blvd., Box 4870, Los Angeles, CA 90048). *Am. J. Gastroenterol.* 69(2): 160-165; 1978.

Gallstone dissolution and biliary lipids were determined and compared in patients receiving eithe chenodeoxycholic acid (CDC, 28 patients) or CDC and phenobarbital (PB, 20 patients) for 1.5-2 yr, to determine whether PB enhances CDC-induced gall stone dissolution. Among patients with radioluce gallstones, dissolution occurred in 53% of those receiving CDC alone and in only 25% of those receiving both CDC and PB. No dissolution occurre in 13 other patients with calcified gallstones. tients with dissolution had a significantly grea molar percentage of CDC (p<0.02) and a significa lower saturation index in bile than those withou dissolution (p<0.01). Diarrhea and transiently normal liver function tests were the most freque observed side-effects, but only diarrhea necessitated a reduction of the CDC dose. Gallstones r curred following dissolution in one of six patie followed for 6 months after discontinuation of C In conclusion, PB did not enhance either CDC-ind desaturation of bile or gallstone dissolution.

6483 STENOSING ODDITIS: DIAGNOSIS AND TREA REPORT OF 109 CASES.

(Fre.) Lataste, Guegan, Y.; Albou, J. C. (Hopital Intercommunal Creteil, 40, avenue de Verdun, 94 Creteil, Franc *J. Chir. (Paris)* 114(5):317-328; 1977.

A series of 109 patients treated for stenosing ditis represented only 4.5% of all patients wit benign lesions of the extrahepatic bile ducts. Clinical signs were episodes of severe pain (91 icterus (63%), and hyperthermia (41%); these sy toms were of long duration in 74% of the patien Radiologically, the lower choledochus showed a acteristic image of stenosis, but this was ofte obscured by a dilated bile duct. The diagnosis had to be confirmed surgically in 103 patients. Peroperative radiomanometry showed no duodenal sage in 19/76 patients or elevated pressure in 45/76 patients; the pressure was normal 4 times The odditis was almost always accompanied by lithiasis and/or pancreatitis. Treatment was sur

l: sphincterotomies (72) in patients under 50 yr
when there was reflux in a dilated Wirsung's
nal with associated pancreatitis and biliary
rivations (35) in older or weaker patients, es-
cially when the common bile duct was very dil-
ed. Surgical results were good in 84 patients;
ere were 8 instances of minor complications and
of major complications (11 were fatal). Long-
rm results were better and local complications
curred less frequently when biliary derivations
re performed. Since the presence of chronic
ncreatitis did not seem to aggravate the odditis,
hincterotomies should not be performed routinely,
t reserved for young patients with only slightly
lated common bile ducts. For all other patients,
liary derivations should be the treatment of
oice.

84 GRANULAR CELL MYOBLASTOMA OF THE GALLBLADDER. (Eng.) Ishii, T.; Iri, H.;
mamoto, S.; Shinozawa, Y.; Sudoh, M. (Keio Univ.
h. Medicine, 35, Shinanomachi, Shinjuku-ku,
kyo 160, Japan). *Am. J. Gastroenterol.* 68(1):
-44; 1977.

85 UNUSUAL ECHOGRAPHIC APPEARANCE OF A COURVOISIER GALL BLADDER. (Eng.)
eks, L. E.; McCune, B. R.; Martin, J. F.;
Brien, T. F., Jr. (Bowman Gray Sch. Medicine,
nston-Salem, NC). *J. Clin. Ultrasound* 5(5):
1-342; 1977.

86 ROUTINE OPERATIVE CHOLANGIOGRAPHY: A CRITICAL APPRAISAL. (Eng.) Seif, R. M.
oanoke Memorial Hosp., Roanoke, VA). *Am. J. Surg.*
4(5):566-568; 1977.

87 DISOPYRAMIDE-INDUCED INTRAHEPATIC CHOLESTASIS [Letter to Editor]. (Eng.)
inertz, T.; Langer, K. H.; Kasper, W.; Just, H.
I Medizinische Klinik, Universitat Mainz, D-6500
inz, W. Germany). *Lancet* 2(8042):828-829; 1977.

88 FINE NEEDLE CHOLANGIOGRAPHY (FNC) IN THE NON-JAUNDICED PATIENT [Abstract]. (Eng.)
ller, F. S.; Katon, R. M.; Dotter, C. T.; Bilbao,
K.; Rosch, J. (Univ. Oregon Health Sciences
nter, Portland, OR). *Clin. Res.* 26(2):110A;
78.

89 BILIARY TRACT OBSTRUCTION: NEW APPROACHES TO OLD PROBLEMS. (Eng.) Blumgart, L. H.
oyal Infirmary, Glasgow G4 OSF, Scotland).
J. Surg. 135(1):19-31; 1978.

90 BILIARY TRACT SURGERY. (Eng.) Pickleman, J. R. (Loyola Univ. Medical Center, 2160
uth First Ave., Maywood, IL 60153). *Surg. Clin.*
rth Am. 57(6):1221-1234; 1977.

6491 CHANGING STATUS OF THE NATURE OF CHOLELITHIASIS AND BILIARY LIPID COMPOSITION IN TAIWAN [Abstract]. (Eng.) Hsu, S. C.; Chen, J. S.; Ho, K. J. (Natl. Taiwan Univ. Hosp., Taipei, Taiwan). *Fed. Proc.* 37(3):698; 1978.

6492 IATROGENIC INJURIES TO THE BILIARY DUCTAL SYSTEM. (Eng.) Glenn, F. (New York Hosp.-Cornell Medical Center, New York, NY). *Surg. Gynecol. Obstet.* 146(3):430-434; 1978.

6493 "GALLSTONE ILEUS", TIMES TWO. (Eng.) Giustra, P. E.; Root, J. A.; Killoran, P. J. (Penobscot Bay Medical Center, Rockland, ME 04841). *Am. J. Gastroenterol.* 67(6):613-615; 1977.

6494 VARICES OF THE COMMON BILE DUCT AS A SURGICAL HAZARD. (Eng.) Hymes, J. L.; Haicken, B. N.; Schein, C. J. (Montefiore Hosp., 111 E. 210 St., Bronx, NY 10467). *Ann. Surg.* 43 (10):686-688; 1977.

6495 A COMPARISON OF THE "PHRYGIAN CAP" DEFORMITY WITH BISTABLE AND GRAY SCALE ULTRASOUND. (Eng.) Edell, S. (Univ. Pennsylvania Hosp., Philadelphia, PA 19104). *J. Clin. Ultrasound* 6(1):34-35; 1978.

6496 GRANULAR CELL MYOBLASTOMA OF THE BILIARY TREE. (Eng.) Savage, A.; Devitt, P. (Southmead Hosp., Westbury-on-Trym, Bristol, England). *Postgrad. Med. J.* 53(623):574-577; 1977.

6497 GALLBLADDER WITH ECTOPIC GASTRIC MUCOSA: ULTRASTRUCTURAL ANALYSIS. (Eng.) Runge, P. M.; Schwartz, J. N.; Seigler, H. F.; Woodard, B. H.; Shelburne, J. D. (Duke Univ. Medical Center, Durham, NC). *Arch. Pathol. Lab. Med.* 102(4):209-211; 1978.

6498 DOUBLE PATHOLOGY IN ACUTE CHOLECYSTITIS. (Eng.) Black, R. B. (Queen Elizabeth Hosp., Woodville Rd., Woodville, South Australia 5011, Australia). *Aust. N.Z. J. Surg.* 47(6):798-801; 1977.

See also, 5852, 5853, 5854, 5948, 5958, 5959, 5962, 5998, 6063, 6064, 6065, 6066, 6068, 6069, 6071, 6075, 6076, 6080, 6082, 6083, 6090, 6091, 6092, 6093, 6094, 6095, 6103, 6235, 6236, 6325, 6326, 6328, 6329, 6332, 6356, 6367, 6381, 6390, 6391, 6392, 6400, 6404, 6406, 6408, 6500, 6533.

6499 INCIDENCE AND SIGNIFICANCE OF DIFFERENT TYPES OF CONNECTIVE TISSUE ANTIBODIES IN ADULT AND PEDIATRIC GASTROENTEROLOGICAL DISORDERS. (Eng.) Rizzetto, M.; Bonino, F.; Pera, A.; Barbera, C.; Santini, B. (Ospedale Mauriziano Umberto I, Cs Turati 46, I-10128 Torino, Italy). *Digestion* 17(1): 29-37; 1978.

To evaluate the clinical relevance of connective tissue antibodies (CTA), they were assessed in sera from 3,000 adult and 388 pediatric patients with gastroenterological disorders involving the stomach, esophagus, and duodenum (31%), liver (52%), colon (8%), pancreas (4.5%), and small bowel (4.5%). A standard fluorescein-conjugated antiserum technique was employed. R_1 antibodies were found in 9 adults with celiac disease (8) and Crohn's disease (1) and in 47 children with celiac disease; malabsorption was a constant feature in patients with R_1 antibodies. Adherent cell antibodies were found in 2 children and 101 adults. These antibodies were not associated with any single clinical entity and occurred in patients with and without malabsorption; however, their incidence was 30% in individuals with steatorrhea but only 3% in those without steatorrhea ($p<0.01$). R_2, KC, and Rs antibodies were observed in adults having unrelated disorders without malabsorption. Although R_2, KC, and Rs antibodies seem to have no clinical significance in gastroenterology, R_1 appears to be related to a malabsorption syndrome and adherent cell antibodies are related to primary and secondary malabsorption.

6500 THE PROTEAN GASTROINTESTINAL MANIFESTATIONS OF METASTATIC BREAST CARCINOMA. (Eng.) Chang, S. F.; Burrell, M. I.; Brand, M. H.; Garsten, J. J. (Yale Univ. Sch. Medicine, New Haven, CT 06510). *Radiology* 126(3):611-617; 1978.

Case histories are presented for eight women with breast cancer metastatic to the gastrointestinal tract. Five of the cases were occult, and the patients presented after 7-24 symptom-free yr. In these eight cases, breast cancer metastasized to the esophagus, stomach, colon, uterus, liver, gallbladder, and common bile duct. Some of the cases simulated other diseases, e.g., Crohn's disease or uterine fibroids, which caused difficulty in diagnosis. These findings indicate the importance of being familiar with all the manifestations of metastatic breast cancer and of obtaining a complete medical history.

6501 ANTIBIOTIC-ASSOCIATED DIARRHEA TREATED WITH ORAL TETRACYCLINE. (Eng.) DeJesus, R.; Peternel, W. W. (Mercy Hosp., 1400 Locust St., Pittsburgh, PA 15219). *Gastroenterology* 74(5, Part 1):818-820; 1978.

The cases of three patients with protracted antibiotic-associated diarrhea who did not recover when antibiotics were stopped but had a prompt improvement after tetracycline administration are presented. The patients developed severe, incapacitating diarrhea after antibiotic administration. Presenting features included abdominal discomfort, hematochezia, and hypokalemia from voluminous diarrhea. Roentgenographic studies in one patient were normal, and proctoscopy in two patients failed to show antibiotic-associated colitis. Stool cultures were negative. Despite cessation of antibiotics and symptomatic therapy, the diarrhea continued. After the administration of tetracycli (250 mg, p.o., 4x/day for 1-5 days), the diarrhea stopped without recurrence even after the tetracycline was discontinued. These clinical results suggest that patients with antibiotic-associated diarrhea may benefit from tetracycline when standa medical therapy fails.

6502 PROPHYLACTIC DOXYCYCLINE FOR TRAVELERS' DIARRHEA: RESULTS OF A PROSPECTIVE DOUBLE-BLIND STUDY OF PEACE CORPS VOLUNTEERS IN KENYA. (Eng.) Sack, D. A.; Kaminsky, D. C.; Sack R. B.; Itotia, J. N.; Arthur, R. R.; Kapikian, A. Z.; *et al.* (Baltimore City Hosp., 4940 Eastern Ave., Baltimore, MD 21224). *N. Engl. J. Med.* 298 (14):758-763; 1978.

A randomized double-blind study was carried out to determine the efficacy of doxycycline (100 mg/day) in preventing travelers' diarrhea among 39 Peace Corps volunteers during their first 5 weeks in Kenya. The volunteers took either doxycycline or placebo for 3 weeks and were observed for an additional 2 weeks. Nine of 21 taking placebo and 1 of 18 taking doxycycline had travelers' diarrhea during the treatment period ($p=0.012$). The protection seemed to persist for at least 1 week aft the drug was stopped. Enterotoxigenic *Escherichi coli* was the only pathogen isolated from the placebo group, but was not detected in persons takin doxycycline. None of these organisms were resist to doxycycline or tetracycline, whereas resistanc to tetracyclines and other antibiotics was common among the nonenterotoxigenic *E. coli*. It is concluded that doxycycline effectively prevented mos episodes of travelers' diarrhea.

6503 EFFECT OF A LACTOBACILLI PREPARATION O TRAVELER'S DIARRHEA: A RANDOMIZED, DOU BLIND CLINICAL TRIAL. (Eng.) de Dios Pozo-Olan J.; Warram, J. H., Jr.; Gomez, R. G.; Cavazos, M. G. (11602 Vantage Hill Rd., Reston, VA 22090). *Gastroenterology* 74(5, Part 1):829-830; 1978.

The effectiveness of prophylactic ingestion of a commercial preparation of lactobacilli (Lactinex for the prevention or modification of traveler's diarrhea was tested in a randomized double-blind clinical trial in 50 volunteer travelers to Mexi from the United States. Twenty-six subjects received the lactobacilli preparation, and 24 received placebo. The incidence of diarrhea and its duration during the 4 weeks of observation were similar for the two preparations: 35% for lactobacilli-treated subjects and 29% for placebo subjects. Typically, the diarrhea was mild, lasting 2 days. It is concluded that prophylactic ingestion of lactobacilli for 1 week

s not reduce the incidence or duration of
veler's diarrhea, either during the period of
estion or during the following 3 weeks.

4 FECAL STEROIDS IN DIARRHEA. II. TRAVELLERS' DIARRHEA. (Eng.) Huang, C. T. L.;
ll, J. N.; Merson, M.; Nichols, B. L. (Baylor
l. Medicine, Houston, TX 77030). *Am. J. Clin.*
r. 31(4):626-632; 1978.

investigate the hypothesis that fecal steroid
files may provide a means of biochemical differ-
iation among episodes of acute diarrhea caused
different etiological agents, fecal bile acid
neutral sterol patterns of five healthy adult
unteers from the United States who contracted
vellers' diarrhea (TD) in Mexico City in 1974
e studied by the collection and analysis of
al samples obtained during and either before
4 weeks after recovery. The only pathogen in
r of these patients was the heat-stable-only
erotoxin-producing strain of *Escherichia coli*.
ol culture for pathogens was negative in the
th subject. Bacterial 7α-dehydroxylation of
lic and chenodeoxycholic acids was not altered
diarrhea associated with toxigenic *E. coli*
t-stable, although total concentrations of bile
ds in the feces in mg/g of feces (wet weight)
e decreased during the diarrheal episode (1.3 ±
versus 3.3 ± 0.4 in controls, $p<0.02$). Con-
tent with findings on bile acids, no signifi-
t changes in the production of coprostanol from
lesterol were observed. Although total con-
trations of cholesterol metabolites, in mg/g of
es (wet weight), were reduced in diarrhea, the
ference was not significant statistically (2.2 ±
versus 5.4 ± 0.8 in controls, $p>0.05$). There
an apparent increase in bacterial alteration
fecal steroids in the subject who showed no
hogens in stool culture, despite a decrease in
al steroid concentrations of a magnitude similar
those observed in diarrhea associated with *E.*
i heat-stable. The production of coprostanol
correlated with 7α-dehydroxylation of cholic
d ($r=0.829$, $p<0.001$) and chenodeoxycholic acid
0.749, $p<0.001$). The results from this study
in striking contrast to the changes in gastro-
estinal steroid metabolism previously observed
acute shigellosis. In TD associated with ST-
coli, the ability of colonic flora to degrade
rols apparently remains intact, which may explain
lack of change in bacterial degradation of in-
tinal steroids observed in these patients.

5 VASOACTIVE INTESTINAL PEPTIDE AND THE WATERY DIARRHEA SYNDROME. (Eng.) Ebeid,
M.; Murray, P. D.; Fischer, J. E. (Massachusetts
eral Hosp., Boston, MA 02114). *Ann. Surg.* 187(4):
-416; 1978.

an effort to determine whether vasoactive
estinal peptide (VIP) is a mediator in the watery
rrhea syndrome, a sensitive and specific radio-
unoassay for the detection of VIP was used to
dy 180 healthy controls and various patients
h the watery diarrhea syndrome. Normal values for VIP were established as 42.8 ± 2.26 pg/ml in plasma (range 22-70 pg/ml). In 11 patients, the syndrome was associated with tumors, and plasma levels of VIP were elevated (210-2,100 pg/ml). VIP levels returned towards normal in five treated patients coincident with amelioration of symptoms. Normal values were obtained in patients with chronic pancreatitis, sprue, medullary carcinoma, Zollinger-Ellison Syndrome, and laxative abuse. In six other patients with an indistinguishable syndrome and no findings of tumor at laparotomy and autopsy, VIP levels were normal. The results suggest that VIP may be the causative agent in patients with the watery diarrhea syndrome and tumors, but that an indistinguishable syndrome exists for which VIP is not the cause.

6506 EOSINOPHILIC GASTROENTERITIS WITH OBSTRUCTION: IMMUNOLOGICAL STUDIES OF SEVEN PATIENTS. (Eng.) Caldwell, J. H.; Mekhjian, H. S.; Hurtubise, P. E.; Beman, F. M. (Ohio State Univ. Hosp., 410 W. 10th Ave., Columbus, OH 43210). *Gastroenterology* 74(5, Part 1):825-829; 1978.

Seven patients with eosinophilic gastroenteritis presenting with obstruction of the gastrointestinal tract were studied to characterize further this form of eosinophilic gastroenteritis. Five had required surgical treatment for relief of obstructive symptoms or because of diagnostic uncertainty. Immunological studies, including serum immunoglobulins, serum complement, lymphocyte quantitation, and lymphocyte response to nonspecific mitogens revealed no striking abnormalities. No patient was clinically allergic or food sensitive, and serum IgE was normal in all. A review of the literature since 1970 suggests that the obstructive form of eosinophilic gastroenteritis accounts for about half of the reported cases. Allergy, especially hypersensitivity to food, is not required for the diagnosis.

6507 GASTROINTESTINAL INVOLVEMENT IN NON HODGKIN'S LYMPHOMAS: 31 CASES. (Fre.) Najman, A.; Gorin, N. C.; Barranger, C.; Duhamel, G. (Hopital Saint-Antoine, 184, due du Fg Saint-Antoine, F 75571 Paris Cedex 12, France). *Nouv. Presse Med.* 6(38):3515-3519; 1977.

Gastrointestinal involvement was found in 31/200 patients with non-Hodgkin's lymphomas, and is a distinctive feature of this entity. Multiple lesions were present in 61% of the 31 patients; the gastroduodenal area was involved in 68%, the ileum in 45%, and the rectocolon in 61%. A diffuse histologic pattern was predominant (67%). Prolonged polychemotherapy is the treatment of choice, the specific agents depending upon clinical staging of the disease; in addition, radical surgery is indicated for patients in stages I_D or II_D. High energy irradiation (25 grays to the abdomen) may be associated with surgery and a short chemotherapeutic course for lymphosarcomas only. Among 24 patients with lymphosarcomas, the 24-month survival was 75%, and the median survival was 40 months. Of seven patients with reticulosarcomas, six died within 27 months. Relapses after treatment of primary gastrointestinal localization (8/12) always involved extradigestive tissues (lymph nodes, cavum, and bone).

6508 CALCIFIED PRIMARY TUMORS OF THE GASTROINTESTINAL TRACT. (Eng.) Ghahremani, G. G.; Meyers, M. A.; Port, R. B. (Evanston Hosp.-Northwestern Univ., 2650 Ridge Ave., Evanston, IL 60201). *Gastrointest. Radiol.* 2(4):331-339; 1978.

Experience with 23 primary calcified tumors of the gastrointestinal tract is presented; this information plus information from the literature were used to formulate guidelines for an accurate preoperative diagnosis of such tumors. Histopathologic diagnosis of the tumors was established by endoscopic biopsy, surgery, or autopsy. A retrocardiac mass containing amorphous calcifications was seen to be typical of leiomyoma of the esophagus. Calcific deposits similar to that in uterine fibroids may be the feature of gastric leiomyoma or intestinal leiomyosarcoma. Sand-like deposits within the wall of the stomach or colon were characteristic of a mucinous adenocarcinoma, while clusters of phleboliths in the gastrointestinal wall suggested a hemangioma, particularly if recurrent intestinal bleeding and cutaneous hemangiomas were associated. Sunburst type of calcification in the pancreas indicated a cystadenoma or cystadenocarcinoma of that organ, and aggregates of granular calcifications in the liver were diagnostic for metastatic adenocarcinoma of the colon, but were rarely seen in a primary liver malignancy.

6509 PREVALENCE OF ENDOCRINE ABNORMALITIES IN PATIENTS WITH THE ZOLLINGER-ELLISON SYNDROME AND IN THEIR FAMILIES. (Eng.) Lamers, C. B.; Stadil, F.; Van Tongeren, J. H. (St. Radboud Hosp., Nijmegen, Netherlands). *Am. J. Med.* 64(4):607-612; 1978.

To evaluate the frequency of associated and hereditary endocrinopathies in the Zollinger-Ellison syndrome, 10 patients with the syndrome and 109 family members over 15 yr of age were studied. In 7 of the 10 patients, coexisting endocrine disease was found. In six, the Zollinger-Ellison syndrome was probably a feature of multiple endocrine adenomatosis type 1, whereas Cushing's syndrome in the remaining patient may have been caused by the production of an ACTH-like substance by a mixed pancreatic tumor. All six patients with evidence of multiple endocrine adenomatosis type 1 had relatives with endocrinopathies. In the families of the four other patients with the Zollinger-Ellison syndrome, no endocrine abnormalities were found. During this study, 4 new cases of pituitary tumor, 17 of hyperparathyroidism, 7 of the Zollinger-Ellison syndrome, and 1 of insulinoma were detected. Although most of the disorders were asymptomatic, this clearly indicates that patients with the Zollinger-Ellison syndrome and their families should undergo detailed endocrine studies.

6510 SERUM GASTRIN AND CALCIUM INTERRELATION IN A KINDREDSHIP WITH MULTIPLE ENDOCRINE ADENOMATOSIS [Abstract]. (Eng.) Keith, R. G. (Sunnybrook Medical Center, Toronto, Ontario, Canada). *Ir. J. Med. Sci.* 146(Suppl. 1):18; 1977.

6511 LIVER CHANGES IN KWASHIORKOR. (Eng.) Sengupta, K. P. (No affiliation given). *J. Indian Med. Assoc.* 69(4):91-92; 1977.

6512 ANTACIDS AND GLYCOPYRROLATE [Letter to Editor]. (Eng.) Roberts, R. B. (Wright State Univ. Sch. Medicine, Dayton, OH). *Anesth. Analg. (Cleve.)* 57(1):145-146; 1978.

6513 PRELIMINARY RESULTS OF PHASE I AND II CLINICAL TRIALS OF RFCNU AND RPCNU, TWO NEW NITROSOUREA SUGAR DERIVATIVES IN DIGESTIVE TRACT TUMOURS [Abstract]. (Eng.) Mathe, G.; Hayat, M.; de Vassal, F.; Misset, J. L.; Schwarzen berg, L.; Machover, D.; *et al.* *In: Medical Oncology. Abstracts of the 3rd Annual Meeting of the Medical Oncology Society and of the Bi-Annual Meeting of the Immunology and Immunotherapy Group (C12G), Nice, December 4-6, 1977.* (Springer International): 3(Suppl.):S20; 1977.

6514 HAEMOLYTIC-URAEMIC SYNDROME IN DYSENTER [Letter to Editor]. (Eng.) Chu, J. Y. Gleason, W. A., Jr.; Mestres, H. M. (St. Louis Univ. Sch. Medicine, St. Louis, MO 63104). *Lance* 2(8046):1025-1026; 1977.

6515 PROTEIN TURNOVER, SYNTHESIS AND BREAKDO BEFORE AND AFTER RECOVERY FROM PROTEIN-ENERGY MALNUTRITION. (Eng.) Golden, M. H. N.; Waterloo, J. C.; Picou, D. (Tropical Metabolism Res. Unit, Univ. West Indies, Mona, Kingston 7, Jamaica, West Indies). *Clin. Sci. Mol. Med.* 53(5):473-477; 1977.

6516 CYTOTOXIC EFFECTS OF ALCOHOL ON HEMATO IETIC AND INTESTINAL CELLS. (Eng.) Lindenbaum, J. (Harlem Hosp. Center, New York, N *Adv. Exp. Med. Biol.* 85A:415-427; 1977.

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6518 TREATMENT OF MASSIVE GASTROINTESTINAL HEMORRHAGE FROM AORTOENTERIC FISTULA. (Eng.) Mehta, A. I.; McDowell, D. E.; James, E. C. (Veterans Admin. Hosp., Clarksburg, WV). *Su Gynecol. Obstet.* 146(1):59-62; 1977.

9 NEONATAL NECROTIZING ENTEROCOLITIS:
THERAPEUTIC DECISIONS BASED UPON CLINICAL
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Brotherton, T. (St. Louis Children's Hosp.,
S. Kingshighway, St. Louis, MO 63110). *Ann.*
j. 187(1):1-7; 1978.

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Grumet, F. C. (Stanford Univ. Sch. Medi-
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cago, IL 60611). *Gastrointest. Radiol.* 2(3):
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4 DERANGEMENTS OF BIOSYNTHESIS, PRODUCTION
AND SECRETION OF MUCUS IN GASTROINTESTINAL
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CYTES OF MALNOURISHED CHILDREN. (Eng.)
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HOUSE-FRIDERICHSEN SYNDROME, SICKLE-CELL
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ig, J. P.; Sutton, A. L. (Los Angeles County
p., 1200 North State St., Los Angeles, CA
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Dodge, J. A.; Hamdi, I.; Walker, S.
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6529 FATAL ROTAVIRUS GASTROENTERITIS: AN ANALYSIS OF 21 CASES. (Eng.) Carlson, J. A. K.; Middleton, P. J.; Szymanski, M. T.; Huber, J.; Petric, M. (Hosp. Sick Children, 555 University Ave., Toronto, Ontario M5G 1X8, Canada). *Am. J. Dis. Child.* 132(5):477-479; 1978.

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6532 SALIVARY AMINO ACIDS AND PROTEINS IN NORMAL AND MALNOURISHED EGYPTIAN INFANTS AND YOUNG CHILDREN. (Eng.) El-Shobaki, F. A.; Ibrahim, A.; El-Hawary, M. F. S.; Sakr, R.; Said, A. (Natl. Res. Center, Dokki, Cairo, Egypt). *Z. Ernaehrungswiss.* 17(1):19-25; 1978.

6533 GIANT CYSTIC ABDOMINAL MASSES IN CHILDREN AND ADOLESCENTS: ULTRASONIC DIFFERENTIAL DIAGNOSIS. (Eng.) Wicks, J. D.; Silver, T. M.; Bree, R. L. (Univ. Michigan Medical Center, Ann Arbor, MI 48109). *Am. J. Roentgenol.* 130(5):853-857; 1978.

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6536 CARBOHYDRATE INTOLERANCE ASSOCIATED WITH ACUTE GASTROENTERITIS: A PROSPECTIVE STUDY OF 90 WELL-NOURISHED INDIAN INFANTS. (Eng.) Kumar, V.; Chandrasekaran, R.; Bhaskar, R. (Postgraduate Inst., Medical Education and Res., Chandigarh, India). *Clin. Pediatr.* 16(12):1123-1127; 1977.

6537 THE LIVER IN KWASHIORKOR (A CLINICO-HISTOPATHOLOGICAL STUDY). (Eng.) Praharaj, K. C.; Choudhury, U. (M. K. C. G. Medical Coll., Berhampur, Ganjam, Orissa, India). *J. Indian Med. Assoc.* 69(4):77-80; 1977.

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6539 INDICATIONS FOR PNEUMOPERITONEUM IN THE DIAGNOSIS OF CONGENITAL ANOMALIES IN THE UMBILICAL REGION. (Eng.) Vidal, J.; Cortina, H.; Alonso, A.; Alberto, C.; Lanuza, A.; Perez-Candela, V. (Clinica Infantil "La Fe," Valencia, Spain). *Pediatr. Radiol.* 6(3):147-152; 1977.

6540 DERMATOLOGIC ABNORMALITIES ASSOCIATED WITH GASTROINTESTINAL MALIGNANT AND PREMALIGNANT DISEASES. (Eng.) Kurtz, R. C.; Sherlock, P.; Winawer, S. J. (Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY 10021). *Int. J. Dermatol.* 17(1):14-19; 1978.

6541 HEPATIC METABOLISM OF AMINOPYRINE IN PATIENTS WITH CHRONIC RENAL FAILURE. (Eng.) Scherrer, S.; Haldimann, B.; Kupfer, A.; Reubi, F.; Bircher, J. (Dept. Clinical Pharmacology, Univ. Berne, Murtenstrasse 35, CH-3010 Berne, Switzerland). *Clin. Sci. Mol. Med.* 54(2):133-140; 1978.

6542 RIFAMPICIN THERAPY IN SHIGELLOSIS IN INFANCY. (Eng.) Naveh, Y.; Strahovsky, P.; Friedman, A. (Rambam Medical Center, Haifa, Israel). *Arch. Dis. Child.* 52(12):960-961; 1977.

6543 FIBEROPTIC ENDOSCOPY OF THE GASTROINTESTINAL TRACT IN INFANTS AND CHILDREN. I. UPPER ENDOSCOPY IN 53 CHILDREN. (Eng.) Liebman, W. M. (Univ. California, San Francisco Sch. Medicine, San Francisco, CA 94143). *Am. J. Gastroenterol.* 68(4):362-366; 1977.

6544 ASSESSMENT FOR THE VALUE OF SERUM LACTI
DEHYDROGENASE IN PROTEIN-ENERGY MALNUTR
TION. (Eng.) Metwalli, O. M.; Galal, O. M.; Hashem, A. A. (Food Science and Nutrition Res. Dept., Natl. Res. Center, Dokki, Cairo, Egypt). *Z. Ernaehrungswiss.* 16(4):231-234; 1977.

6545 THE SURGICAL MANAGEMENT OF RECURRENT
PAROTITIS. (Eng.) Casterline, P. F.;
Jaques, D. A. (Walter Reed Army Medical Center, Washington, DC). *Surg. Gynecol. Obstet.* 146(3): 419-422; 1978.

6546 RELATION OF BREAST VERSUS BOTTLE FEEDI
TO HOSPITALIZATION FOR GASTROENTERITIS
A MIDDLE-CLASS U.S. POPULATION. (Eng.) Larsen,
S. A., Jr.; Homer, D. R. (Kaiser-Permanente Medi
Center, 27400 Hesperian Blvd., Hayward, CA 94545
J. Pediatr. 92(3):417-418; 1978.

6547 CYTOMEGALOVIRUS INFECTION OF THE GASTR
INTESTINAL TRACT IN A PATIENT WITH LAT
ONSET IMMUNODEFICIENCY SYNDROME. (Eng.) Freema
H. J.; Shnitka, T. K.; Piercey, J. R. A.; Weinstein, W. M. (Dept. Medicine, 9-112 Clinical Sciences Building, Univ. Alberta, Edmonton, Alberta T6G 2G3, Canada). *Gastroenterology* 73(6
1397-1403; 1977.

See also, 5848, 6048, 6051, 6058, 6063, 6067, 60
6084, 6085, 6086, 6087, 6088, 6089, 61
6153, 6154, 6155, 6181, 6192, 6226, 62
6254, 6301, 6317, 6326, 6338, 6341, 64
6444, 6466, 6554.

GENERAL

Parasitology

6548 HYDATID DISEASE OF THE LIVER. (Eng.) Barros, J. L. (Hosp. Provincial, Madrid, Spain). *Am. J. Surg.* 135(4):597-600; 1978.

Experience in the surgical management of hydatid disease of the liver in 212 patients over the past 18 yr is reviewed. There was associated pathologic disease of the biliary tract in 47 patients. The most common preoperative complication was rupture into the bile ducts (36 patients). Upper abdominal pain was the most common symptom, and a palpable mass or hepatomegaly was present in two-thirds of the patients. Liver scanning with radioactive isotopes was the most helpful routine diagnostic aid, the results being positive in 91% of the patients. The most common surgical treatment used (148 patients) consisted of removing the parasite (cystectomy) and treatment of the residual pericysti
cavity. Pericystectomy involved en block resect
of the intact cyst with the entire pericystic la
and was employed in 28 patients. Cholecystecto
was performed in 9 of the 47 patients with bili
tract disease, removal of common duct stones in
and evacuation of intraductal membranes in 4. I
ternal drainage into the gastrointestinal tract
performed in 14 patients with major bile fistul
to the pericystic cavity. Pericystojejunostomy
with a Roux-en-Y anastomosis of jejunum, was pe
formed in 11 patients, and pericystogastrostomy
carried out in 3. The results of therapy were

lent in 96% of patients with simple cysts. There
e eight deaths: four occurred in patients with
tured hepatopulmonary cysts, one was due to
phylactic shock after traumatic rupture of a
t, and two were due to terminal hepatic failure
rrhosis) and bleeding esophageal varices. One
raoperative death was ascribed to formalin tox-
ty. Postoperative infections occurred in 29
ients, and recurrent intra-abdominal disease was
ate complication that occurred in 18 patients.
servative excision of solitary or multiple cysts
recommended for most patients with hydatid liver
ease. It is important to establish whether hep-
c cysts communicate with the biliary tree, and
associated biliary disease should be taken
e of at the same time. In patients in whom the
t has penetrated the diaphragm and communicates
h the lung, treatment should be carried out in
stage whenever possible.

9 ENZYME IMMUNOASSAY FOR THE SERODIAGNOSIS
OF PARASITIC INFECTIONS. (Eng.) Ruiten-
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herlands). *Biomedicine* 26(5):311-314; 1977.

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Andrew, E. D.; Marrocco, G. R. (Cooley
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60). *JAMA* 238(19):2027-2028; 1977.

1 PATTERN OF INTESTINAL PARASITIC INFECTION
AND SERUM IgG, IgA AND IgM LEVELS IN
ETANS AND INDIANS. (Eng.) Gupta, R. M.; Gupta,
M.; Gupta, I. M.; Marwah, S. M. (Inst. Medical
ences, Banaras Hindu Univ., Varanasi, India).
Indian Med. Assoc. 69(2):31-33; 1977.

6552 AGE AND SEX DISTRIBUTION OF INFECTIONS WITH *Entamoeba histolytica* AND *Giardia intestinalis* IN THE LAGOS POPULATION. (Eng.) Oyerinde, J. P. O.; Ogunbi, O.; Alonge, A. A. (Coll. Medicine, Univ. Lagos, PMB 12003, Lagos, Nigeria). *Int. J. Epidemiol.* 6(3):231-234; 1977.

6553 WHY "HEPATIC ARTERY HYPERTROPHY AND SINUSOIDAL HYPERTENSION IN ADVANCED SCHISTOSOMIASIS" [Letter to Editor]. (Eng.) Beker G., S. (Dept. Medicine, Universidad Central de Venezuela, Caracas, Venezuela). *Gastroenterology* 74 (2, Part 1):333; 1978.

6554 THE PREVALENCE OF HUMAN INTESTINAL PROTOZOA IN IBADAN, NIGERIA. (Eng.) Ogunba, E. O. (Univ. Coll. Hosp., Ibadan, Nigeria). *J. Trop. Med. Hyg.* 80:187-191; 1977.

6555 SEVERE ACUTE TOXIC AMOEBIC COLITIS REQUIRING TOTAL COLECTOMY: CASE REPORT. (Eng.) Hof, D. G.; Vergara, G. G.; Hartwig, F. H.; Hill, J. H. (Univ. Minnesota Hosp., Minneapolis, MN). *Mo. Med.* 75(1):21-23, 28; 1978.

See also, 5997, 5998, 6060, 6338, 6499.

GENERAL

Regional Enteritis

6 PROGNOSIS IN CHILDREN WITH CROHN'S DIS-
EASE. (Eng.) Gryboski, J. D.; Spiro,
M. (Yale Univ. Sch. Medicine, 333 Cedar St.,
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807-817; 1978.

gain information on the prognosis of Crohn's
ease in children, the course of 86 children
h Crohn's disease was examined during a 10-yr
iod, between 1966 and 1976. Patients were
ssified according to the initial site of dis-
e. Ileocolitis was the most (52%) common and
itis the least (9%) common form of disease
h diffuse small bowel or ileal disease each
prising nearly 20% of the study group. These
ures show a reversal from those of a previous
ade, when 42% of the patients had only terminal
ileal disease and 17% had ileocolitis. Children with ileocolitis had the highest number of extracolonic manifestations and operations and required steroid therapy the longest. Those with only small bowel disease (with the exception of duodenal involvement) had fewer extraintestinal symptoms and operations and showed a consistently good response to medical treatment.

6557 THE VARIED MANIFESTATIONS OF CROHN'S DISEASE IN CHILDREN AND ADOLESCENTS. (Eng.) Dubois, R. S.; Rothschild, J.; Silverman, A.; Sabra, A. (Dept. Child Health, Univ. Sydney, Sydney, Australia). *Am. J. Gastroenterol.* 69(2):203-211; 1978.

Experience with 30 children less than 15 yr of age with histologically or radiologically proven Crohn's disease is reported. The mean age of onset was 9 yr and 5 months. Delay in diagnosis may stem from the varying modes of presentation. The mean delay in diagnosis was 2 yr. Chronic diarrhea and/or recurrent abdominal pain associated with extraintestinal manifestations, particularly abnormalities of growth and development, suggests the possibility of Crohn's disease in the pediatric age group. Involvement of the terminal ileum occurred in 29 of the 30 patients. In addition, colonic disease occurred in 13 and jejunal involvement in 1. Four patients presented with an acute onset of their disease; a favorable response to either medical or surgical therapy occurred in all four. Twenty-six patients had an insidious onset and tended to have a chronic course despite either medical and/or surgical therapy. Thirteen patients had an intestinal resection, with recurrence occurring in three from 1-4 yr postoperatively. To date there has been one death.

6558 A COMPARISON OF THE STRUCTURE AND FUNCTION OF THE TERMINAL ILEUM IN CROHN'S DISEASE USING RADIOLOGY, THE "DICOPAC" SCHILLING TEST AND [^{14}C]G.C.A. BREATH TEST.

(Eng.) Glover, S. C.; Mowat, N. A. G. (Dept. Medicine, Univ. Aberdeen, Aberdeen, Scotland). *Eur. J. Nucl. Med.* 3(2):121-124; 1978.

Terminal ileal function was measured by a glycholic acid (GCA) breath test and judged by radiological appearance, and the results were compared to determine whether the breath test might provide additional evidence of terminal ileal disease in patients with Crohn's disease. Twenty patients with biopsy-proven Crohn's disease were studied. Thirteen had radiological evidence of involvement of the terminal ileum. None had significant bacterial overgrowth of the small bowel contents, and none had had resection of the terminal ileum. In all patients, a ^{14}C-GCA breath test and a "Dicopac" Schilling test were performed to assess terminal ileal function (26 patients with functional diarrhea and 44 healthy subjects served as controls for the latter test). The data showed poor correlation between the radiological appearance of the terminal ileum and the results of the functional tests (6/10 patients with abnormal function tests also had abnormal radiological appearance; 7/10 patients with normal function tests had abnormal radiological appearance). There was also poor correlation between the results of the ^{14}C-GCA breath test and the "Dicopac" Schilling test (the tests agreed 11/20 times, of which 10 findings were normal). Without terminal ileal histology, any assessment of the extent of Crohn's disease of the terminal ileum and of its effect on terminal ileal function must include the ^{14}C-GCA breath test as well as radiology and the "Dicopac" Schilling test. The limitations of the ^{14}C-GCA breath test as a test of terminal ileal function in Crohn's disease are discussed.

6559 PLATELET KINETICS IN CROHN'S DISEASE.

(Eng.) Bremer, G.; Jacobi, E.; Miller, B.; Ehms, H.; Strohmeyer, G. (2. Medizinische Klinik u Polikinik der Universitat, Moorenstrasse 5, D-4000 Dusseldorf, W. Germany). *Klin. Wochenschr.* 56(7): 365-367; 1978.

To investigate the pathogenesis of thrombocytosis in Crohn's disease, 10 nontreated patients were examined and compared with 10 healthy controls using the ^{51}Cr-labeling technique. There was a si nificant elevation of platelet count in the patien compared with the controls (550,000 ± 150,000/µl versus 15,000-300,000/µl, $p<0.001$). The average platelet survival time was significantly shortened in the patients compared with the controls (6.9 days versus 9 days, $p<0.001$). Organ scanning for surface radioactivity revealed no differences between the two groups, indicating that neither stor ing nor sequestration occurred in any of the organ examined (heart, liver, spleen, and bone marrow); the recovery rate for injected ^{51}Cr activity was 55-60%. Platelet turnover was markedly accelerate in the patients (95,000/µl/day) compared with the controls (25,000/µl/day). Platelet function, meas ured as adhesiveness in the fiber test, was depressed in Crohn's disease compared with controls when the differences in platelet count between the two groups was considered. Platelet production is augmented in Crohn's disease and exceeds the reduced survival time. The increased thrombopoiesis may lead to the production of platelets with a physiological defect and so to increased periphera elimination. The elevated platelet production remains unexplained. It might be due to the possibl thrombopoietic action of certain humoral transmitt substances present only in Crohn's disease.

6560 COMPARISON OF THE RESULTS OF RESECTION, BYPASS, AND BYPASS WITH EXCLUSION FOR ILEOCECAL CROHN'S DISEASE.

(Eng.) Homan, W. P.; Dineen, P. (New York Hosp.-Cornell Medical Center New York, NY). *Ann. Surg.* 187(5):530-535; 1978.

The course of 161 patients with Crohn's disease s over a 43-yr period who underwent primary surgery for the disease is reviewed to determine the most liable treatment method. Resection was performed 115 patients, bypass with exclusion in 25, and si to-side ileotransverse colostomy in 21. Overall currence rates were 25% for resection, 63% for by with exclusion, and 75% for simple bypass. At 15 follow-up, recurrence rates were 65% for resectio 82% for bypass with exclusion, and 94% for simple pass. The superiority of resection over either b is significant ($p<0.005$ at 5 yr). Much of the di ference in final outcome was accounted for by ear recurrence or by persistent disease in the two bypass groups. This difference amounted to 21% for the bypass with exclusion and 45% for simple bypa as compared with 3% for patients who had resectio It is concluded that (1) resection can be perform with a morbidity and mortality equivalent to eith of the bypass procedures, (2) the recurrence rate following resection is significantly lower than b pass with exclusion or simple bypass and amounts about 4% per year, (3) continuing disease in the bypassed loop accounts for a high percentage of r

rations in the bypass groups, while appearance
new disease is the usual problem following re-
tion, and (4) resection is the surgical treatment
choice for ileocecal Crohn's disease.

51 ORAL 25-HYDROXYVITAMIN D$_3$ IN TREATMENT OF
OSTEOMALACIA ASSOCIATED WITH ILEAL RESEC-
ON AND CHOLESTYRAMINE THERAPY. (Eng.) Compston,
E.; Horton, L. W. L. (St. Thomas' Hosp., London
., England). *Gastroenterology* 74(5, Part 1):900-
; 1978.

ause the therapeutic applications of vitamin D
abolites and analogues have recently become of
siderable interest, the use of p.o. 25-hydroxy-
amin D$_3$ (25-OHD$_3$) in a woman with Crohn's dis-
e who developed severe histological osteomalacia
r after ileal resection and the start of choles-
amine therapy (4 g, 2x/day). Treatment with
OHD$_3$ (50 μg/day) produced marked biochemical,
iological, and histological improvement after
onths. It is suggested that cholestyramine, by
ucing vitamin D absorption, precipitated the
id development of osteomalacia in this patient.
s case report emphasizes the importance of rou-
e vitamin D supplementation in all patients on
g-term cholestyramine therapy, and indicates
t even in patients with small intestinal disease
resection, p.o. preparations of vitamin D or its
abolites and analogues may be effective.

52 ANKYLOSING SPONDYLITIS AND INFLAMMATORY
BOWEL DISEASE. I. PREVALENCE OF INFLAM-
ORY BOWEL DISEASE IN PATIENTS SUFFERING FROM
YLOSING SPONDYLITIS. (Eng.) Meuwissen, S. G.
Dekker-Saeys, B.; Agenant, D.; Tytgat, G. N. J.
ept. Medicine, Univ. Amsterdam, Amsterdam, Nether-
ds). *Ann. Rheum. Dis.* 37(1):30-32; 1978.

establish the prevalence of inflammatory bowel
ease in ankylosing spondylitis (AS), 79 AS pa-
nts underwent detailed medical screening, in-
uding sigmoidoscopy and roentgenology. Forty-
ght patients had gastrointestinal symptoms,
the others did not. In three patients, a
agnosis of Crohn's disease was made, which
been previously established. In all other
ients inflammatory bowel disease was excluded.
prevalence of inflammatory bowel disease in
s series of patients with AS therefore was 3.8%.
ere were two patients without Crohn's disease in
m distal rectal pathology was attributed to
al anti-inflammatory treatment. It appears that
ominal symptoms in most of the patients with AS
e not related to inflammatory bowel disease, but
bably to an irritable bowel syndrome.

53 ZINC DEFICIENCY IN CROHN'S DISEASE. (Eng.)
Solomons, N. W.; Rosenberg, I. H.; Sand-
ead, H. H.; Vo-Khactu, K. P. (Inst. Nutrition
tral America and Panama, Carretera Roosevelt,
Zona 11, Apartado 11-88, Guatemala City, Guatemala). *Digestion* 16(1/2):87-95; 1977.

Zinc nutrition was studied using plasma zinc, hair zinc, and taste acuity as indices in 20 adult patients (20-62 yr old) and in 10 adolescent patients (10- to 19-yr old), all of whom were classified as having Crohn's disease (either regional enteritis, ileocolitis, or granulomatous colitis), and the results were compared with those in 20 control adults and 39 control adolescents. The adult patients had a mean plasma zinc concentration of 62.3 ± 9.3 μg% compared with 74.3 ± 9.7 μg% in the controls. Adolescent controls had a mean plasma zinc concentration of 78.6 ± 17.6 μg% compared with 46.2 ± 12.6 μg% ($p<0.001$) in the five adolescent patients with growth retardation or delayed sexual maturation and 75.2 ± 27.7 μg% in the five adolescent patients who maintained normal growth patterns. There was no significant difference between the plasma zinc levels of the 13 adult patients who were taking steroids and the 7 who were not. There was a strong correlation between plasma zinc concentrations and plasma albumin levels for the 20 adult controls, the 20 adult Crohn's patients, and the 5 growth-retarded adolescents ($p<0.001$). Hair zinc content in Crohn's disease tended to be low, but was without the statistical significance observed for plasma zinc. The mean score in the taste detection test of -6.6 ± 4.8 for the 20 adult Crohn's patients was significantly lower ($p<0.001$) than the adult control mean of -2.0 ± 1.5. The mean taste detection score for the five growth-retarded adolescents was -5.2 ± 4.8 compared with -0.8 ± 1.0 for the control adolescents ($p<0.001$). It is concluded that zinc deficiency commonly exists in patients with Crohn's disease and that the low plasma zinc concentrations may reflect a reduction of plasma zinc-binding protein (albumin) due to gastrointestinal loss and/or impaired synthesis.

6564 EXPERIMENTAL EVIDENCE ESTABLISHING THE PRESENCE OF A WALL-DEFECTIVE *Pseudomonas*-LIKE BACTERIAL VARIANT IN CROHN'S DISEASE [Abstract]. (Eng.) Parent, K.; Mitchell, P. D. (Marshfield Clinic, Marshfield, WI). *Gastroenterology* 72(5, Part 2):1111; 1977.

6565 NATIONAL COOPERATIVE CROHN'S DISEASE STUDY (NCCDS): RESULTS OF DRUG TREATMENT [Abstract]. (Eng.) Anonymous. (Univ. Colorado Medical Center, Denver, CO 80262). *Gastroenterology* 72(5, Part 2):1133; 1977.

6566 SUCCESSFUL TREATMENT OF CROHN'S DISEASE WITH BROAD-SPECTRUM ANTIBIOTICS: INITIAL AND LONG-TERM RESULTS [Abstract]. (Eng.) Moss, A. A.; Carbone, J. V.; Kressel, H. Y. (Univ. California Medical Sch., San Francisco, CA). *Gastroenterology* 72(5, Part 2):1106; 1977.

6567 THE EFFICACY OF IMMUNOSUPPRESSIVE THERAPY IN CROHN'S DISEASE. A RANDOMIZED LONG TERM DOUBLE BLIND STUDY [Abstract]. (Eng.) Present, D. H.; Wisch, N.; Glass, J. L.; Korelitz, B. I. (Mount Sinai Sch. Medicine, New York, NY). *Ga troenterology* 72(5, Part 2):1114; 1977.

See also, 6228, 6265, 6273, 6297, 6312, 6313, 631
6315, 6316, 6317, 6319, 6320, 6321, 649
6506, 6528.

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

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The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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LANGUAGE ABBREVIATIONS

Afrikaans	Afr.
Albanian	Alb.
Arabic	Ara.
Armenian	Arm.
Azerbaijani	Aze.
Belorussian	Bel.
Bengali	Ben.
Bulgarian	Bul.
Burmese	Bur.
Chinese	Chi.
Croatian	Cro.
Czechoslovakian	Cze.
Danish	Dan.
Dutch	Dut.
English	Eng.
Esperanto	Esp.
Estonian	Est.
Finnish	Fin.
Flemish	Fle.
French	Fre.
Gaelic	Gae.
Georgian	Geo.
German	Ger.
Greek	Gre.
Hausa	Hau.
Hebrew	Heb.
Hindi	Hin.
Hungarian	Hun.
Icelandic	Ice.
Indonesian	Ind.
Interlingua	Int.
Italian	Ita.
Japanese	Jpn.
Kirghiz	Kir.
Korean	Kor.
Latin	Lat.
Latvian	Lav.
Lithuanian	Lit.
Marathi	Mar.
Masai	Mas.
Multilingual	Mlt.
Norwegian	Nor.
Persian	Per.
Polish	Pol.
Portuguese	Por.
Pushto	Pus.
Rumanian	Rum.
Russian	Rus.
Serbian	Ser.
Slovak	Slo.
Slovene	Slv.
Spanish	Spa.
Swahili	Swa.
Swedish	Swe.
Tagalog	Tag.
Tamil	Tam.
Telugu	Tel.
Thai	Tha.
Turkish	Tur.
Ukranian	Ukr.
Urdu	Urd.
Vietnamese	Vie.
Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
amp	ampere
ATP	adenosine triphosphate
A	angstrom
BSP	sulfobromophthalein
C	degrees centigrade
cal	calories
cc	cubic centimeter
cm	centimeter(s)
dl	deciliter
DNA	deoxyribonucleic acid
ED_{50}	median effective dose(s)
EDTA	ethylenediamine tetraacetic acid
e.g.	for example
EEG	electroencephalogram
ESR	erythrocyte sedimentation rate
g	gram(s)
μg	microgram(s)
Hz	Hertz
hr	hour(s)
Ig	immunoglobulin(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kcal	kilocalorie(s)
kg	kilogram(s)
K_m	Michaelis constant
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar; mole(s)
mM	millimolar; millimole(s)
μM	micromolar; micromole(s)
ma	milliampere(s)
mCi, μCi	milli-, microcurie(s)
mEq	milliequivalent(s)
mg	milligram(s)
ml, μl	milli-, microliter(s)
mm	millimeter(s)
mOsm	milliosmolar; milliosmeter(s)
msec	millisecond(s)
mV	millivolt(s)
min	minute(s)
MTD	maximum tolerated dose
NAD	nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotidephosphate
NADPH	reduced nicotinamide adenine dinucleotidephosphate
ng	nanogram (10^{-9})
nm	nanometer(s)
Pa	ambient pressure
PAS	periodic acid - Schiff
pg	picogram (10^{-12})
pgEq	picogram equivalent(s)
p.o.	orally
ppb	parts per billion
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
V	volt
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

6568 IMMUNOHISTOCHEMICAL IDENTIFICATION OF GASTROINTESTINAL NEUROTENSIN CELLS IN HUMAN EMBRYOS. (Eng.) Helmstaedter, V.; Muhlmann, B.; Feurle, G. E.; Forssmann, W. G. (Anatomisches Institut der Universitat, Im Neuenheimer Feld 307, D-6900 Heidelberg, W. Germany). *Cell Tissue Res.* 184(3):315-320; 1977.

The development of the endocrine gastroenteropancreatic (GEP) system was studied in 10 human embryos (4-21 weeks), with special reference to neurotensin-immunoreactive cells. These cells were first present in the ileal and jejunal mucosa of 12- to 13-week-old embryos. Thereafter, the neurotensin-immunoreactive cells were found regularly in these segments of the gut with an increasing number of them towards the terminal ileum. At about the 20th week of gestation, the neurotensin cells were detected also in the lower duodenum, i.e., the distribution pattern was more extensive at this age than in younger embryos or adults. The cells were of triangular or elongated shape and their apical pole reached the gut lumen, and they thus looked like other types of small intestinal endocrine cells.

6569 ULTRASTRUCTURE OF THE HUMAN ANTRAL G CELLS DURING FASTING. (Eng.) Zaviacic, M.; Brozman, M.; Jakubovsky, J.; Duris, I. (Inst. Pathology, Komensky Univ., Sasinkova 4, 80100 Bratislava, Czechoslovakia). *Exp. Pathol. (Jena)* 14(3/4):131-135; 1977.

To study the influence of fasting on the ultrastructure of the human antral G cells, six healthy men who were fasted for 24 hr, a seventh (heavier than average weight) who was fasted for 240 hr, and two controls were examined by gastrobiopsy carried out without morphine or atropine. The biopsy material was prepared immediately for electron microscopy. In the controls and in the subjects fasted for 24 hr (3 had water and 3 did not), G cells with granules of different densities and with emptied granules were found; the numerical ratio of the dense and emptied granules was variable. Dense lysosomes were rarely seen in these cells. The subject who was fasted for 240 hr was examined at both 72 and 240 hr. At both times, the G cells had mostly emptied granules. In some of the granules, small residues of contents were observed. The membrane of the granules was preserved. Emiocytosis did not occur. At 240 hr, dense lysosomes with engulfed granules were seen. The authors believe that the dissolution of the granules in the G cells was due to the long fasting and not to the mechanical irritation of the gastrobiopsy technique. The role of psychic stress during fasting cannot be estimated in this experiment.

6570 CULTURE OF ISOLATED SMOOTH MUSCLE CELLS OF RAT DUODENUM. (Fre.) Miachon, S.; Biol, M. C.; Cier, J. F.; Chardonnet, Y. (UER Medicale Grange Blanche, 8 avenue Rockefeller, 69373 Lyon Cedex 2, France). *C.R. Soc. Biol. (Paris)* 171(4):804-808; 1977.

Smooth muscle cells were isolated from Sprague-Dawley rat duodena by either trypsinization (0.2%) or collagenation (0.05%) and cultured to study their catecholamine receptors. The cells were cultured in either Eagles' minimum essential medium (MEM) with glutamine and nonessential amino acids or medium RPMI 1640 (from Gibco), both with 10% fetal calf serum. Transfers were attempted on the 15th day (the cells were confluent) by mechanical means and/or trypsinization. The best results were achieved when trypsinization was used to isolate the cells; there was no difference in results between the two culture media. At the beginning, the cultures consisted mainly of smooth muscle cells and a few fibroblasts; on day 5, myofibrils were identifiable in 20% of the cells, and on day 12, in 2%. Two transfers were performed over a period of 50 days, although very few cells could be induced to grow again. Trypsinization only was the least damaging method of cell transfer. Myofibrils were not demonstrable in any of the transferred cells. In view of the rapid dedifferentiation and low yield of cells, this method is, at present, rather unsuitable for the study of receptor sites.

6571 DUODENAL BOMBESIN CELL PATHOLOGY [Abstract]. (Eng.) McCrossan, M. V.; Polak, J. M.; Bloom, S. R.; Hobbs, S.; Pearse, A. G. E. (Hammersmith Hosp., London, England). *Gut* 18(5): A407; 1977.

6572 INDIVIDUAL VARIANTS OF THE LOCATION OF THE HEPATIC ARTERIES IN THE LOWER HALF OF THE HEPATODUODENAL LIGAMENT. (Rus.) Yakubovskaya, E. V.; Tabakov, A. I. (Zaporozhe Inst. Advanced Training Physicians, Zaporozhe, USSR). *Vestn. Khir.* 120(1):23-26; 1978.

6573 INTRAEPITHELIAL LYMPHOCYTES OF THE SMALL INTESTINE. PART 1: MORPHOLOGY AND EXPERIMENTAL IMMUNOLOGY OF INTRAEPITHELIAL LYMPHOCYTES. (Eng.) Ferguson, A. (Western General Hosp., Edinburgh, Scotland). *Gut* 18(11):921-937; 1977.

6574 ULTRASTRUCTURE OF THE INNERVATION OF THE DUCTS WITHIN THE RABBIT PAROTID GLAND. (Eng.) Cope, G. H. (Dept. Human Biology and Anatomy, Univ. Sheffield, Sheffield S10 2TN, England). *Arch. Oral Biol.* 22(12):715-719; 1977.

6575 ULTRASTRUCTURAL LOCALIZATION OF ADRENERGIC NERVE TERMINALS IN THE CIRCULAR MUSCLE LAYER AND MUSCULARIS MUCOSAE OF RAT DUODENUM AFTER

ACUTE TREATMENT WITH 6-HYDROXYDOPAMINE. (Eng.) Wong, W. C. (Faculty Medicine, Univ. Singapore, Sepoy Lines, Singapore 3, Singapore). *J. Anat.* 124(3):637-642; 1977.

6576 ADRENERGIC INNERVATION OF THE HUMAN GALL BLADDER. (Eng.) Kyosola, K.; Penttila, O. (Dept. Anatomy, Univ. Helsinki, Siltavuorenpenger 20 A, SF-00170 Helsinki 17, Finland). *Histochemistry* 54(3):209-218; 1977.

6577 VILLUS GROWTH AND CELL REPLACEMENT IN THE SMALL INTESTINE OF THE NEONATAL PIG. (Eng.) Smith, M. W.; Jarvis, L. G. (ARC Inst. Animal Physiology, Babraham, Cambridge CB2 4AT, England). *Experientia* 33(12):1587-1588; 1977.

6578 ELECTRON MICROSCOPY OF THE CONNECTIVE TISSUES BETWEEN LONGITUDINAL AND CIRCULAR MUSCLE OF SMALL INTESTINE OF CAT. (Eng.) Taylor, A. B.; Kreulen, D.; Prosser, C. L. (Dept. Physiology and Biophysics, Univ. Illinois, Urbana, IL 61801). *Am. J. Anat.* 150(3):427-441; 1977.

6579 THE RESULTS OF LIGHT AND ELECTRON MICROSCOPIC INVESTIGATIONS ON THE QUALITY OF VESSEL NERVES IN THE STOMACH. (Eng.) Stach, W. (Bereichs Medizin der Wilhelm-Pieck Universitat, Gertrudenstrasse 9, GDR-25 Rostock, E. Germany). *Fol. Morphol. (Praha)* 25(3):217-219; 1977.

See also, 6642, 6652, 6676, 6741, 6747, 6748, 6841, 7101, 7209.

ABSORPTION - EXCRETION - TRANSPORT

6580 FAILURE OF GLUCAGON TO INFLUENCE ION TRANSPORT ACROSS HUMAN JEJUNAL AND ILEAL MUCOSA IN VITRO. (Eng.) Isaacs, P. E. T.; Turnberg, L. A. (Hope Hosp., Eccles Old Rd., Salford, M6 8HD, England). *Gut* 18(12):1059-1061; 1977.

To assess whether glucagon-stimulated intestinal secretion is due to a direct effect on mucosal ion transport or is secondary to motility and blood flow changes, the influence of glucagon on human intestinal mucosa was studied *in vitro* where these complicating factors are eliminated. Stripped human intestinal mucosa from surgical specimens was used. The mucosal potential difference (PD), short-circuit current (SCC), and resistance (R) tended to fall in all tissues tested, and there was no difference between controls and glucagon-treated (0.2, 0.5, 1.0, or 2.0 ng/ml) tissues. Measurement of ion fluxes in jejunal and ileal mucosa revealed that glucagon (0.2-2.0 ng/ml) did not influence ion transport in either tissue. Net sodium absorption in the presence of glucose was greater in ileal than in jejunal tissues. Net chloride transport was not significantly different from zero in jejunal tissues, but there was a marked absorption of chloride in most ileal tissues. These results confirm previous reports of differences between the *in vitro* behavior of jejunal and ileal mucosa and suggest that the intestinal secretion and diarrhea produced *in vivo* in man during i.v. infusion of glucagon may be produced by changes in motility and blood flow.

6581 MECHANISMS OF TRANSPORT OF Na, Cl, AND K IN THE HUMAN COLON. (Eng.) Hawker, P. C.; Mashiter, K. E.; Turnberg, L. A. (Hope Hosp., Eccles Old Rd., Salford M6 8HD, Lancashire, England) *Gastroenterology* 74(6):1241-1247; 1978.

In view of the apparent discrepancies between species in colonic transport, ionic transport across isolated, stripped, human colonic mucosa was studied *in vitro* using a modified short circuit current technique. Electrical potential difference and short circuit current were dependent on the presence of sodium ions in the mucosal bathing solution and were unaffected by addition of 10 mM glucose to the solution. Ouabain (10^{-3} M) added to the serosal reservoir abolished both potential difference and short circuit current. Isotopic flux measurements across short-circuited colonic mucosa showed a net active sodium absorption that accounted for the observed short circuit current and was unaffected by 10 mM glucose. Chloride was also actively absorbed and this was unaffected by removal of sodium from the bathing solutions. Ouabain abolished net sodium absorption but had no effect on chloride absorption. There was a net active secretion of potassium that was abolished in sodium-free buffer. It is concluded that sodium is actively absorbed via a rheogenic process that is not stimulated by glucose; chloride is actively absorbed via a nonelectrogenic process, not linked to sodium transport, and probably involving a $Cl^-HCO_3^-$ exchange; and potassium is actively secreted possibly via a Na^+K^+ exchange.

6582 EFFECTS OF DIETARY PROTEIN ON BODY WEIGHT MUCOSAL GROWTH, AND CALCIUM ABSORPTION

IN THE RAT. (Eng.) Moyer, G. L.; Wilson, H. D.; Schedl, H. P. (Univ. Iowa Coll. Medicine, Iowa City, IA 52242). *Am. J. Dig. Dis.* 23(6):545-549; 1978.

To determine whether a duodenal or ileal calcium transport response could account for decreased fecal calcium excretion reported in rats fed high-protein diets, calcium transport by these two segments was examined directly by *in situ* perfusion. Weight-matched growing rats were pair-fed isocaloric diets for 6-8 days containing 89% protein (casein), 39% protein, or 0% protein. Sucrose was substituted for the decreased casein in the 39% and 0% protein diets. Each diet also contained 5% fat, a mineral mix, and vitamins. Calcium content of all diets was 0.5%. Body weight was maintained by the 39% protein group; weight loss was 5% for the 89% protein group and 18% for the 0% protein group. Small intestinal weight as a percentage of body weight was the same for the three groups. For both the duodenum and the ileum, mucosal dry weight was greater in the 39% protein group (11.0 ± 0.3 and 7.6 ± 0.2 mg/cm, resp.) than either the 89% protein (9.6 ± 0.4 and 6.4 ± 0.3 mg/cm, resp.) or 0% protein group (9.2 ± 0.3 and 5.9 ± 0.3 mg/cm, resp). Calcium absorption per gram dry weight of mucosa (absorptive specific activity) was the same for all diet groups, but because of the greater mucosal weight per unit length in the 39% protein group, absorption per centimeter was increased in this group. Although no direct relation between dietary protein and mucosal absorptive specific activity for calcium was found, calcium absorption was determined by the amount of mucosa that was dependent on protein intake and reflected the nutritional status of the body.

6583 THE EFFECT ON INTESTINAL CALCIUM ABSORPTION OF SOMATOSTATIN IN MAN. (Eng.)

Evensen, D.; Hanssen, K. F.; Berstad, A. (Aker Hosp., Oslo 5, Norway). *Scand. J. Gastroenterol.* 13(4):449-451; 1978.

The effect of somatostatin on intestinal calcium absorption was investigated in nine healthy subjects to determine whether the action of the hormone is related to its ability to interfere with calcium transport mechanisms. Using an isotope method with ^{51}Cr as a stool marker, the absorption of ^{47}Ca was measured with and without an i.v. infusion of cyclic somatostatin (250 μg/hr, 2 hr). Net absorption fell from 53.0 ± 14% without the infusion to 40.4 ± 13% with somatostatin ($p<0.05$). The results suggest that the actions of somatostatin may be mediated via an inhibition of active calcium transport.

6584 GLUCOSE TRANSPORT BY RAT SMALL INTESTINE AFTER EXTENSIVE SMALL-BOWEL RESECTION.

(Eng.) Urban, E.; Haley, D. P. (Audie L. Murphy Memorial Veterans Hosp., 7400 Merton Minter Blvd., San Antonio, TX 78284). *Am. J. Dig. Dis.* 23(6): 531-540; 1978.

Glucose transport by the rat small intestine was studied after extensive bowel resection. Fifty centimeters of proximal or distal small intestine were resected, preserving duodenum and terminal ileum. Glucose transport was studied 5-6 weeks later, using everted gut sacs from duodenum, ileum, and also from a midgut segment consisting of intestine located preresection at mid-small intestine. Sham-operated animals served as controls. In controls, the inner (serosal) fluid medium in sacs from duodenum and midgut gained glucose; ileal sac serosal medium lost glucose. Proximal resection resulted in significant growth of duodenal and midgut mucosa ($p<0.05$). Duodenal transport specific activity decreased from control values (from 77.5 ± 9.8 to 36.2 ± 4.7 μmol/g dry mucosa in 1 hr), but mucosal growth compensated so sac transport capacity (transport/cm sac length) remained unchanged. Midgut transport specific activity remained unchanged; thus sac transport capacity directly mirrored increased mucosal mass. Ileal sac serosal medium now accumulated glucose; there was no mucosal growth. Transport specific activity and sac transport capacity of ileum increased in parallel. After distal resection, there was no alteration of either duodenal and midgut mucosal masses or transport specific activities; hence sac transport capacities remained unchanged. Ileal sac serosal medium also accumulated glucose, but now both transport specific activity and mucosal mass increased. The resultant increased sac transport capacity was identical to that of ileum after proximal resection. In all sacs from control and resected animals, uphill ^{14}C-glucose concentration differences developed between medium and mucosa. Activity of the mucosal uptake process, assessed in terms of a ratio of mucosal intracellular fluid radioactivity to mucosal medium radioactivity, usually mirrored altered transport specific activity. This indicates that the increased undercoats tissue mass that accompanied increased mucosal mass did not critically affect transport. The most striking findings were: (1) decreased duodenal transport specific activity after proximal resection with mucosal growth compensating and (2) identical adaptations of ileal segment transport capacities after either proximal or distal small bowel resections, although mechanisms differed. The present study provides a base for further examinations of carrier-mediated nexose transport after extensive loss of small intestine.

6585 ASCORBATE STIMULATION OF SALICYLATE ABSORPTION IN ISOLATED RAT INTESTINE.

(Eng.) Barnett, G.; Lockwood, T.; Arancibia, A.; Benet, L. Z. (Natl. Inst. on Drug Abuse, Rockville, MD 20857). *J. Pharm. Sci.* 67(2):224-226; 1978.

The interaction of ascorbate with salicylate transport across the isolated rat intestine was studied *in vivo* and *in vitro*. *In vitro,* the flux of labeled salicylate from the mucosal to the serosal side of the tissue was measured before and after ascorbate was added to the serosal solution. Salicylate reached a new steady-state flux after ascorbate addition over a concentration range of 1-57 mM. The tissue permeability had a saturable dependence on ascorbate concentration. Ascorbate (6 mM) also increased the short-circuit current by 13%, with onset immediately after ascorbate addition to the medium and with leveling to a constant value at 70 min. This stimulatory effect was essentially due to a decrease in tissue resistance, suggesting that the effect of ascorbate treatment on electrical properties is different from those of theophylline or ouabain. Similar results were obtained *in vivo*.

6586 INTESTINAL THIAMIN [sic] TRANSPORT: EFFECT OF CHRONIC ETHANOL ADMINISTRATION IN RATS. (Eng.) Hoyumpa, A. M., Jr.; Nichols, S.; Henderson, G. I.; Schenker, S. (Veterans Admin. Hosp., Nashville, TN 37203). *Am. J. Clin. Nutr.* 31(6):938-945; 1978.

The effect of chronic ethanol treatment on intestinal thiamine transport was studied in female Sprague-Dawley rats. The rats were fed the DeCarli-Lieber ethanol diet for 6 to 8 weeks, and ^{14}C-thiamine uptake and exit from enterocytes were measured in inverted gut sacs and correlated with basolateral membrane Na-K ATPase activity. The thiamine transport rate and Na-K ATPase activity were not affected in chronic ethanol-treated rats compared to pair-fed controls. Ethanol concentrations in gut lumen and plasma at the time of the study were 39.3 ± 15.3 and 40.2 ± 19.4 mg/100 ml, resp., although higher levels were noted at other times. Tissue thiamine pyrophosphate remained normal. In contrast, ethanol-treated rats given an extra dose of ethanol intragastrically (250 mg/100 g body weight) 1 hr before study showed a decrease in cellular exit of 0.2 and 0.5 μM thiamine to 44% and 56% of control, resp., ($p<0.025$) and of Na-K ATPase to 32% of control ($p<0.001$) when gut and plasma ethanol levels were 318.3 ± 38.7 and 185.0 ± 8.7 mg/100 ml, resp. These studies (a) confirm the inhibitory effect of ethanol on thiamine transport, (b) show that inhibition is dependent more on the ethanol concentration than on the duration of exposure to ethanol, and (c) suggest that thiamine malabsorption in this animal model may be intermittent. These findings may be relevant to the development of thiamine deficiency in alcoholics with periodic binge drinking.

6587 ASCORBIC ACID TRANSPORT IN ILEUM FOLLOWING DIET OF HIGH OR LOW ASCORBIC ACID CONTENT [Abstract]. (Eng.) Rose, R. C.; Nahrwold, D. L. (Pennsylvania State Univ. Coll. Medicine, Hershey, PA). *Gastroenterology* 72(5, Part 2):1122; 1977.

6588 INTESTINAL ABSORPTION OF ALANINE FROM DIPEPTIDE (Di-P) TRIPEPTIDE (Tri-P) AND TETRAPEPTIDE (Tetra-P) IN RAT [Abstract]. (Eng.) Chung, Y. C.; Kim, Y. S. (Veterans Admin. Hosp., San Francisco, CA). *Gastroenterology* 72(5, Part 2):1038; 1977.

6589 DUAL MECHANISM OF ASSIMILATION OF L-LEUCYL-L-LEUCINE (LEULEU) BY RAT SMALL INTESTINE [Abstract]. (Eng.) Rosen, E. M. (Stanford Univ., Stanford, CA 94305). *Gastroenterology* 72(5, Part 2):1188; 1977.

6590 DEVELOPMENT OF VALINE ABSORPTION IN THE SMALL INTESTINE OF RATS [Abstract]. (Eng.) Younoszai, M. K. (Univ. Iowa Hosp., Iowa City, IA). *Gastroenterology* 72(5, Part 2):1168; 1977.

6591 pH-VALUES IN THE SMALL INTESTINE OF RATS AND THEIR POSSIBLE ROLE IN THE ABSORPTION OF BILE ACIDS [Abstract]. (Eng.) Konder, H.; Haberich, F. J.; Stockert, H. G. (Institut fur Angewandte Physiologie, 3550 Marburg/Lahn, Lahnberge, W. Germany). *Pfluegers Arch.* 368(Suppl.):R20; 1977.

6592 THE EFFECT OF DIETARY FIBRE (GUAR GUM) ON CARBOHYDRATE ABSORPTION [Abstract]. (Eng.) Dilawari, J. B.; Leeds, A. R.; Gassull, M. A.; Haisiman, P.; Jenkins, D. J. A. (Central Middlesex Hosp., London NW10, England). *Gastroenterology* 72(5, Part 2):1049; 1977.

6593 EFFECT OF CELLULAR cAMP ON THE TRANSPORT OF SUGARS AND SODIUM BY THE JEJUNUM IN VIVO AND BY BRUSH BORDER VESICLES IN VITRO [Abstract]. (Eng.) Lucke, H.; Kinne, R.; Murer, H. (Max-Planck-Institut fur Biophysik, Kennedyallee 70, 6000 Frankfurt [Main], W. Germany). *Pfluegers Arch.* 368(Suppl.):R21; 1977.

6594 THE COTRANSPORT OF SUGAR AND SODIUM IN CHOLERA [Abstract]. (Eng.) Desjeux, J. F.; Dumontier, A. M.; Lestradet, H. (INSERM U-83, Hopital Herold, 75935 Paris, France). *Pediatr. Res.* 11(9):1029; 1977.

6595 TRH INHIBITS THE ABSORPTION OF GLUCOSE AND XYLOSE FROM THE GUT [Abstract]. (Eng.) Dolva, O.; Hanssen, K. F. (Aker Hosp., Oslo, Norway). *Acta Endocrinol. (Kbh.)* 85(Suppl. 212):194; 1977.

6596 DIURNAL RHYTHM OF GLYCINE ABSORPTION IN MAN--PROBABLY HORMONAL CONTROL [Abstract]. (Eng.) Butt, J.; Carpenter, M.; Parker, K. M.; Jacobs, L.; Durkin, M. (Harry S Truman Memorial Veterans Hosp., Columbia, MO). *Gastroenterology* 72(5, Part 2):1035; 1977.

6597 COMPARISON OF WATER AND ELECTROLYTE TRANSPORT IN THE SMALL INTESTINE OF SUCKLING(S)

AND ADOLESCENT (A) RATS [Abstract]. (Eng.) Laughlin, M. (Univ. Iowa Hosp., Iowa City, IA). *Gastroenterology* 72(5, Part 2):1190; 1977.

6598 OSMOTIC AND ELECTROLYTE CONCENTRATION GRADIENTS AND OSMOTIC DIARRHEA: IN VIVO STUDIES IN THE RAT [Abstract]. (Eng.) Hamburger, S. (Dept. Medicine, Univ. Iowa, Iowa City, IA). *Gastroenterology* 72(5, Part 2):1188; 1977.

See also, 6641, 6744, 6750, 6753, 6765, 6953, 7074.

MOTILITY

6599 RELATION BETWEEN VOLUME SWALLOWED AND VELOCITY OF THE BOLUS EJECTED FROM THE PHARYNX INTO THE ESOPHAGUS. (Eng.) Fisher, M. A.; Hendrix, T. R.; Hunt, J. N.; Murrills, A. J. (Guy's Hosp. Medical Sch., London, England). *Gastroenterology* 74(6):1238-1240; 1978.

The velocity of the front face of a liquid saline bolus ejected from the pharynx into the esophagus was measured by recording changes of luminal electrical impedance with three sets of electrodes in nine healthy subjects. At a site 26 cm from the incisors, the mean velocity of the front face of the bolus increased from 10 to 70 cm/sec as the volume swallowed was raised from 5 to 30 ml. The velocity of the front face of the bolus was greater 26 cm from the incisors than it was 32 cm from the incisors. These findings demonstrate that the greater the volume of the bolus, the greater the velocity of ejection.

6600 ALTERED LOWER ESOPHAGEAL SPHINCTER FUNCTION DURING EARLY PREGNANCY. (Eng.) Fisher, R. S.; Roberts, G. S.; Grabowski, C. J.; Cohen, S. (Temple Univ. Hosp., 3400 N. Broad St., Philadelphia, PA 19140). *Gastroenterology* 74(6): 1233-1237; 1978.

To determine whether lower esophageal sphincter (LES) function is normal during early pregnancy, studies were performed in eight pregnant women before and after abortion. Resting LES pressures were 22.1 ± 2.4 and 22.6 ± 2.3 mm Hg before and after abortion, resp. During early pregnancy, the LES pressure responses to pentagastrin (1.0 μg/kg) were inhibited significantly ($p<0.001$), compared with that 6 weeks after abortion. The LES responses to edrophonium and methacholine were decreased also ($p<0.02$ in both cases). LES pressure responses to a protein meal were diminished in an additional five pregnant women. Serum concentrations of estrogen and progesterone were elevated during pregnancy, but the serum concentration of gastrin was unchanged. It is concluded that, in early pregnancy, the basal LES pressure was within normal limits, but the LES pressure responses to hormonal, pharmacological, and physiological stimulation were reduced (during demonstrated elevations of serum concentrations of estrogen and progesterone). These studies suggest that during early pregnancy, when no clinical symptoms of reflux are present, altered LES function may be demonstrated.

6601 EFFECT OF INTRAGASTRIC BILE ON CANINE LOWER OESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Laitinen, S.; Mokka, R. E. M.; Larmi, T. K. I. (Univ. Central Hosp., SF-90220, Oulu 22, Finland). *Scand. J. Gastroenterol.* 13(3):369-372; 1978.

A study was carried out to elucidate the immediate effect of intragastrically instilled bile on lower esophageal sphincter pressure (LESP) in the dog. Seven mongrel dogs were studied manometrically under thiopentone anesthesia. Resting LESP and intragastric pH were determined, after which 5 ml of fresh canine bile or of physiological saline (control) were instilled into the stomach and changes in LESP and intragastric pH were recorded for 1 hr. After bile instillation, LESP increased from 17.6 ± 2.3 to 26.4 ± 3.6 mm Hg ($p<0.01$) in 20 min and then gradually returned to the initial level by 60 min. The pH of the bile and saline were 7.7 ± 0.2 and 7.0 ± 0.1, resp. After bile instillation, intragastric pH rose from 2.7 ± 0.3 to 3.0 ± 0.4 and after saline instillation from 2.7 ± 0.3 to 3.0 ± 0.3. The results suggest that intragastric bile contamination, at least one of short duration, does not have any harmful effect on LESP competence and does not seem to predispose to gastroesophageal reflux in dogs.

6602 INDUCTION OF GASTRO-OESOPHAGEAL REFLUX BY ALCOHOL. (Eng.) Kaufman, S. E.; Kaye, M. D. (Univ. Vermont Coll. Medicine, Burlington, VT 05401). *Gut* 19(4):336-338; 1978.

To establish whether alcohol in amounts customarily imbibed during social drinking causes gastroesophageal reflux, 12 healthy young individuals, without symptoms of reflux, were studied twice. Each time, distal esophageal pH was monitored continuously for 3 hr after a standard meal that included either 180 ml of 100 proof vodka or 180 ml water. The order of studies with and without alcohol was random. Peak blood alcohol concentrations ranged between 0.63 and 1.29 g/l. Eleven of the 12 subjects refluxed more after alcohol ($p<0.0034$), and the difference in mean reflux scores for studies with and without alcohol was highly significant ($p<0.0005$). It is concluded that relatively modest quantities of alcohol induce gastroesophageal reflux in healthy people.

6603 GASTRIC EMPTYING RATES OF SOLID FOOD IN RELATION TO BODY SIZE. (Eng.) Lavigne, M. E.; Wiley, Z. D.; Meyer, J. H.; Martin, P.; MacGregor, I. L. (Veterans Admin. Hosp., 4150 Clement St., San Francisco, CA 94121). *Gastroenterology* 74(6):1258-1260; 1978.

The relationship of body size to rates of gastric emptying of solid food was investigated in nine healthy men to obtain data that may allow this variable to be considered when populations of varying size are studied. Rates of gastric emptying were measured using a beef stew meal to which were added pieces of chicken liver tagged with ^{99m}Tc-sulfur colloid and by following the passage of the isotope through the gastrointestinal tract with intermittent γ-imaging. There was an inverse linear relationship between gastric emptying rates and body surface area, and between gastric emptying rates and body weight. The variable of body size must be taken into account when measurements of gastric emptying of solid food are measured.

6604 A UNIQUE DISTRIBUTION OF LAXATIVE-INDUCED SPIKE POTENTIALS FROM THE SMALL INTESTINE OF THE DOG. (Eng.) Atchison, W. D.; Stewart, J. J.; Bass, P. (Sch. Pharmacy, Center for Health Sciences, 425 North Charter St., Madison, WI 53706). *Am. J. Dig. Dis.* 23(6):513-520; 1978.

The effects of castor oil and ricinoleic acid on small bowel electrical activity were studied in fasted conscious dogs and were compared to the effects elicited by two nonlaxative oils (triolein and oleic acid) to determine the mechanism of castor oil and ricinoleic acid laxation. Spike potential activity was monitored at two jejunal sites using unipolar recording electrodes. Castor oil, ricinoleic acid, and triolein (all 40 ml) produced an increased incidence of basic electrical rhythm (BER, $p<0.05$) with associated spike potentials when compared to a fasted control; however, the total electrical spiking activity produced by these oils was not statistically different from that induced by feeding. No treatment altered any of the characteristics of BER. A novel pattern of electrical spiking activity was observed in response to the laxatives. This pattern consisted of short repetitive bursts of spike potentials that migrated the length of the recording site. The laxative-induced electrical pattern persisted for several days after treatment with ricinoleic acid or castor oil, and interdigestive patterns were occasionally interrupted for as long as 72 hr. Electrical activity following feeding or the nonlaxative oils consisted of random spike potentials, and normal interdigestive electrical activity resumed within 24 hr. The laxative-induced electrical pattern was quantitatively distinct from those produced by feeding, fasting, or nonlaxative oils. This pattern may reflect an action of these laxatives on intestinal motility during a diarrheal state.

6605 PHARMACOLOGIC ANALYSIS OF PENDULUM TYPE MOVEMENTS APPEARING DURING THE CALCIUM INDUCED BLOCKADE OF PERISTALSIS IN ISOLATED GUINEA PIG ILEUM. (Fre.) Beleslin, D. (Faculty Medicine, 11000 Beograd, C.P. 662, Yugoslavia). *C.R. Soc. Biol. (Paris)* 171(4):746-750; 1977.

Isolated guinea pig ileum preparations subjected to constant intraluminal pressure to induce peristalsis were then exposed to an excess of $CaCl_2$ on the serosal side to study the induced pendular movements. The Ca^{++} ions (9.1-36.0 mM) blocked the peristalsis, but after 30 min provoked pendulum-like movements (1-7/min) of the longitudinal muscle layer that lasted several hours. The addition of hexamethonium (>100 µg/ml), tetraethylammonium (>100 µg/ml), morphine (1-2 µg/ml), methadone (2-20 µg/ml), and atropine (1-10 ng/ml) to the serosal side blocked the movements, while neostigmine (0.025 µg/ml) potentiated them. From the action of these drugs, it can be concluded that the excess Ca^{++} ions induced the pendular movements by stimulating the postganglionic nerve endings in the longitudinal smooth muscle layer of isolated guinea pig ileum.

6606 PHARMACOLOGIC ANALYSIS OF PERISTALTIC BLOCKADE INDUCED BY THE ADDITION OF MAGNESIUM TO THE SEROSAL OR MUCOSAL SIDES OF ISOLATED GUINEA PIG ILEUM. (Fre.) Beleslin, D.; Samardzic, R. (Faculty Medicine, 11000 Beograd, C. P. 662, Yugoslavia). *C. R. Soc. Biol. (Paris)* 171(4):750-754; 1977.

The effect of various cholinergic drugs on isolated guinea pig ileum was studied after peristalsis had been blocked by magnesium to determine whether their effect is observed when they are applied to either the serosal or the mucosal side. The addition of acetylcholine (100-10,000 µg), metacholine (10-100 µg), eserine (2-20 µg), and neostigmine (5-25 µg) to the serosal side of the ileum antagonized the blocking effect of Mg^{++} ions (2.7-10.8 mM) previously applied to the mucosa. The same effect occurred when choline esters and anticholinesterases were injected intraluminally after the Mg^{++} ions were applied to the serosal side. Histamine (20-100 µg) and 5-hydroxytryptamine (2-200 µg) were not capable of removing the Mg^{++} ion block. These results indicate that cholinoceptive sites within the myenteric plexus, which initiate peristalsis when stimulated with cholinergics, are accessible from either side of the isolated ileum.

6607 STRICTLY ADDITIVE ANTISPASMODIC EFFECTS OF PAPAVERINE AND TIEMONIUM: AN EXAMPLE OF SEQUENTIAL BLOCKADE. (Fre.) Labrid, C.; Dureng, G.; Bert, H. (Laboratoire de Pharmacodynamie, C.E.R.M., 63203 Riom Cedex, France). *C.R. Soc. Biol. (Paris)* 171(4):764-770; 1977.

The effects of the antispasmodics tiemonium and/or papaverine were studied in isolated guinea pig ileum stimulated with $BaCl_2$ or histamine and in isolated rat jejunum stimulated with acetylcholine. When tiemonium was added to the preparations in various concentrations, its competitive antagonism was clearly demonstrated by the parallel shift to the right of the dose response curves compared to controls where only $BaCl_2$, histamine, or acetylcholine was used. The noncompetitive antagonism of papaverine was shown by a decrease in the maximal amplitude of the dose-response curves compared to controls. When both papaverine and tiemonium were used to inhibit the contracting agents, their effect was strictly additive, causing both a shift to the right and a decrease in amplitude. These results indicate a sequential blockade by papaverine and tiemonium on the cholinergic, histaminergic, and Ba^{++} ion receptors of smooth muscle tissue.

6608 ENHANCEMENT OF ELECTRICALLY STIMULATED GUINEA-PIG GALLBLADDER CONTRACTION BY SUBTHRESHOLD CONCENTRATIONS OF GASTROINTESTINAL HORMONES IN VITRO. (Eng.) Foesel, S.; Sewing, K. F. (Dept. Pharmacology, Univ. Tubingen, Wilhelmstrasse 56, D-7400 Tubingen, W. Germany). *Experientia* 34(2):5-6; 1978.

Experiments were carried out to investigate how subthreshold concentrations of cholecystokinin-octapeptide (CCK-OP), pentagastrin (PG), or secretin (S) influence the effects of transmural electrical stimulation (to mimic vagal excitation) on the isolated guinea pig gallbladder. A significant increase in gallbladder contraction in response to electrical stimulation was found after subthreshold concentrations of PG ($13\text{-}73 \times 10^{-9}$ M, $p<0.05$) and CCK-OP ($2\text{-}4 \times 10^{-11}$ M, $p<0.01$). The slight increase after secretin was not statistically significant. Since contractions of the gallbladder in response to both electrical stimulation and acetylcholine were blocked by atropine almost to the same extent, electrical stimulation could be regarded as an equivalent to vagal stimulation *in vivo*. Concentrations of PG and CCK-OP that alone do not contract the isolated guinea pig gallbladder after exposure of the organ to subthreshold concentrations of the hormones do enhance contraction in response to electrical stimulation. Thus, even on a subthreshold level, a synergistic action of hormonal stimulation with neural stimulation is possible. Circulating concentrations of CCK, which alone are inactive, may facilitate gallbladder contraction elicited by nervous excitation. This cooperative action could allow the neuroendocrine system to operate on a more economic level.

6609 INTRACELLULAR STUDY OF ELECTRICAL BEHAVIOR IN TONIC TYPE MYENTERIC NEURONS OF GUINEA PIG SMALL BOWEL [Abstract]. (Eng.) Wood, J. D.; Mayer, C. J. (Univ. Kansas Medical Center, Kansas City, KS 66103). *Fed. Proc.* 37(3):227; 1978.

6610 SIMULTANEOUS MEASUREMENT OF MECHANICAL AND INTRACELLULAR ELECTRICAL ACTIVITY OF CANINE CORPORAL SMOOTH MUSCLE: EFFECTS OF ACETYLCHOLINE AND POTASSIUM [Abstract]. (Eng.) Morgan, K. G.; Szurszewski, J. H. (Mayo Medical Sch., Rochester, MN 55901). *Fed. Proc.* 37(3):227; 1978.

6611 EFFECTS OF MORPHINE SULFATE ON MOTILITY OF THE SMALL INTESTINE [Abstract]. (Eng.) Sussman, S. E.; Stewart, J. J.; Burks, T. F.; Weisbrodt, N. W. (Univ. Texas Medical Sch., Houston, TX 77030). *Fed. Proc.* 37(3):640; 1978.

6612 COMPARISON OF THE MECHANICAL PROPERTIES OF THE PROXIMAL AND DISTAL COLON OF THE RABBIT [Abstract]. (Eng.) Tucker, H. J.; Snape, W. J., Jr.; Cohen, S. (Univ. Pennsylvania, Philadelphia, PA 19104). *Fed. Proc.* 37(3):640; 1978.

6613 INHIBITION OF GASTRIC MOTILITY IN TURKEYS BY AVIAN PANCREATIC POLYPEPTIDE (APP) [Abstract]. (Eng.) Duke, G. E.; Kimmel, J. R. (Coll. Veterinary Medicine, Univ. Minnesota, St. Paul, MN 55108). *Fed. Proc.* 37(3):373; 1978.

6614 MECHANICAL RESPONSES OF CANINE GASTRIC ANTRUM TO CHOLECYSTOKININ VARIANT [Abstract]. (Eng.) Schmalz, P. F.; Go, V. L. W.; Beeler, G. W.; Szurszewski, J. H. (Mayo Medical Sch., Rochester, MN 55901). *Fed. Proc.* 37(3):373; 1978.

6615 ANALYSIS OF MECHANICAL FACTORS IN GASTROESOPHAGEAL COMPETENCE [Abstract]. (Eng.) Bryant, G. H.; DeMeester, T. R. (Tripler Army Medical Center, Honolulu, HI 96859). *Fed. Proc.* 37(3):483; 1978.

6616 NEUROHUMORAL, HORMONAL, AND DRUG RECEPTORS FOR THE LOWER ESOPHAGEAL SPHINCTER. (Eng.) Goyal, R. K.; Rattan, S. (Univ. Texas Health Science Center at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235). *Gastroenterology* 74(3):598-619; 1978.

See also, 6575, 6576, 6578, 6579, 6762, 6764, 6768, 6769, 6781, 6813, 6814, 6828, 6851, 6852.

6617 REGIONAL DISTRIBUTION OF PROSTAGLANDIN-METABOLIZING ENZYMES IN THE MUCOSA OF THE HUMAN UPPER GASTROINTESTINAL TRACT. (Eng.) Peskar, B. M. (Medizinische Klinik, Univ. Freiburg, 7800 Freiburg i. Br., W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(1):49-51; 1978.

To compare the specific activities of the prostaglandin (PG)-metabolizing enzymes 15-hydroxy-PG-dehydrogenase (15-HPGDH), $^{13}\Delta$-reductase (DR), and PG E-9-keto-reductase (PGEKR) in various regions of the human upper gastrointestinal tract, four to six mucosal biopsy specimens were obtained from each of 34 patients undergoing diagnostic endoscopy. Only macroscopically normal tissue was used, and the absence of pathological changes was confirmed histologically. Specimens from the esophagus, gastric fundus, gastric corpus, gastric antrum, and duodenum were analyzed. All three enzymes were found in all regions of the gastrointestinal tract examined, the 15-HPGDH specific activity being highest in every region and the PGEKR specific activity being the lowest. Variations from region to region in the activity of any enzyme were quite small. However, 15-HPGDH activity was significantly lower ($p<0.05$) in the esophagus than in the duodenum; the activity of PGEKR was significantly higher in the duodenum than in the gastric corpus ($p<0.01$), the gastric fundus ($p<0.001$), or the esophagus ($p<0.005$) and significantly lower ($p<0.005$) in the gastric fundus than in the esophagus. The results indicate that control of the biological activity of PGs in the human gastrointestinal tract by enzymatic inactivation is not restricted to only some regions, which suggests a fundamental function of endogenous PGs in the gastrointestinal tract.

6618 THE ROLE OF Ca^{2+} AND Na^{+} IN SECRETORY PROCESSES CONTROLLED BY CHOLINERGIC AND ADRENERGIC AGONISTS IN RAT PAROTID GLANDS [Abstract]. (Eng.) Keryer, G.; Herman, G.; Rossignol, B. (Institut de Biochimie, Universite de Paris-Sud, 91405 Orsay Cedex, France). *Ir. J. Med. Sci.* 146(Suppl. 1):7; 1977.

6619 THE CONTROL OF SUBMAXILLARY GLAND MUCIN PRODUCTION. (Eng.) Phelps, C. F.; Young, A. M. (Dept. Biological Sciences, Univ. Lancaster, Lancaster, LA1 4YQ, England). *Adv. Exp. Med. Biol.* 89:143-154; 1977.

6620 CHEMISTRY AND BIOSYNTHESIS OF MUCIN GLYCOPROTEINS. (Eng.) Carlson, D. M. (Dept. Biochemistry, Purdue Univ., West Lafayette, IN 47907). *Adv. Exp. Med. Biol.* 89:251-273; 1977.

6621 SYNTHESIS AND EXCRETION OF BILE ACID SULFATE ESTERS IN THE ISOLATED PERFUSED RAT KIDNEY. (Eng.) Czygan, P.; Ast, E.; Frohling, W.; Stiehl, A.; Kommerell, B. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting Held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 83-87; 1977.

6622 RENAL MECHANISMS INFLUENCING THE BILE ACID COMPOSITION OF CHOLESTATIC URINE. (Eng.) Barnes, S.; Summerfield, J. A.; Gollan, J. L.; Billing, B. H. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting Held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 89-92; 1977.

See also, 6568, 6574, 6785, 6795, 6848, 6852, 7029, 7044.

SECRETION AND METABOLISM

Stomach

6623 GASTRIN IN THE HUMAN FETUS: DISTRIBUTION AND MOLECULAR FORMS OF GASTRIN IN THE ANTRO-PYLORIC GLAND AREA, DUODENUM AND PANCREAS. (Eng.) Larsson, L. I.; Rehfeld, J. F.; Goltermann, N. (Inst. Medical Biochemistry, Univ. Aarhus, DK-8000 Aarhus C, Denmark). *Scand. J. Gastroenterol.* 12(7):869-872; 1977.

Evidence that neonatal and fetal gastrin is secreted into the blood stream prompted an immunocytochemical and radioimmunochemical evaluation of the development of gastrin in the antrum, duodenum, and pancreas in 11- to 12-week-old fetuses. Pancreatic gastrin was not detected at any of the ages studied. Antral gastrin cells were numerous only in fetuses older than 19 weeks, whereas many strongly immunoreactive gastrin cells were detected in the duodenum of all fetuses. Gastrin component III was found to predominate in the antrum, whereas component II was quantitatively very important in the duodenum. Component I was detected in most extracts of both antrum and duodenum. These observations, together with those reported in animals, suggest that fetal gastrin is delivered to the blood, and that it may exert trophic functions in the fetus.

6624 FASTING AND POSTPRANDIAL SERUM GASTRIN IN NORMAL HUMAN NEONATES. (Eng.) Rodgers, B. M.; Dix, P. M.; Talbert, J. L.; McGuigan, J. E. (Box J-286, JHMHC, Gainesville, FL 32610). *J. Pediatr. Surg.* 13(1):13-16; 1978.

To elucidate information concerning the mechanisms involved in the initiation and regulation of the secretion of gastric acid in the neonate, the levels of gastrin in the blood of normal fasting newborn infants and the alterations in the serum gastrin levels elicited by normal feeding in the first 3 days of life were measured. In 13 infants for whom both maternal venous and umbilical cord venous samples were available, the average gastrin concentration was 92 pg/ml (range 17-183 pg/ml) in the maternal sample but 130 pg/ml (range 39-233 pg/ml) in the cord sample ($p<0.057$). In 22 fasting infants, the average peripheral venous gastrin concentration was 155 pg/ml (range 53-286 pg/ml), which was a significant ($p<0.006$) elevation over the 3- to 5-hr period since birth when the cord venous average gastrin value was 111 pg/ml (range 39-233 pg/ml). In 20 infants, the average fasting serum gastrin concentration was 151 pg/ml (range 31-286 pg/ml) prior to the first feeding, whereas it rose significantly ($p<0.034$) over the 60-hr period prior to the last hospital feeding (to 195 pg/ml, range 49-347 pg/ml). In comparing pre- and postprandial concentrations of serum gastrin, no significant differences were detected between breast- and bottle-fed infants. In 26 infants analyzed at the initial feeding and 14 analyzed at the final feeding, the increase in average serum gastrin concentration 30 min after feeding was not significant. These data support the hypothesis that the human neonate is capable of active gastrin secretion in the first few days of life. The absence of significant elevations in postprandial serum gastrin concentrations suggests the possibility of a relatively immature antral gastrin release mechanism in the newborn human infant.

6625 THE INFLUENCE OF GASTRIN ON PLASMA CALCIUM, BILE AND GASTRIC CALCIUM SECRETIONS IN THE RAT. (Eng.) Krishnamra, N.; Limlomwongse, L. (Dept. Physiology, Mahidol Univ., Bangkok 4, Thailand). *Proc. Soc. Exp. Biol. Med.* 158(1):40-44; 1978.

The influence of gastrin on Ca homeostasis was investigated in anesthetized female Fisher rats. When administered i.p., gastrin (50 μg/g) was found to lower the plasma Ca concentration in both intact rats ($p<0.01$) and thyroparathyroidectomized rats ($p<0.5$) but to exert no significant effect on the rates of urine Ca excretion in the intact rats. Thus, the hypocalcemic effect of gastrin is independent of calcitonin. In search of possible routes of Ca removal from the blood, both the Ca concentration in gastric juice and the total gastric Ca excretion were measured. Total gastric calcium excretion was increased from 14 ± 1.4 to 22 ± 2.4 μg/hr/100 g by the administration of gastrin. The increase in gastric Ca secretion and the hypocalcemic effect were abolished by concurrent administration of secretin (2 U). The bile volume and the Ca content in the bile secretion were not affected by gastrin. These findings were compatible with the hypothesis that the hypocalcemic effect of gastrin was partly caused by an increased Ca excretion into the gastrointestinal lumen.

6626 SELECTIVE RELEASE OF GASTRIC INHIBITORY POLYPEPTIDE BY INTRADUODENAL AMINO ACID PERFUSION IN MAN. (Eng.) Thomas, F. B.; Sinar, D.; Mazzaferri, E. L.; Cataland, S.; Mekhjian, H. S.; Caldwell, J. H.; *et al.* (Ohio State Univ. Hosp., 410 W. 10th Ave., Columbus, OH 43210). *Gastroenterology* 74(6):1261-1265; 1978.

To determine whether different groups of amino acids are more potent stimulators of gastric inhibitory polypeptide, 12 normal subjects received an intraduodenal perfusion of a mixed amino acid solution (158 mM) containing either methionine, phenylalanine, tryptophan, and valine (perfusate 1), or an amino acid solution containing arginine, histidine, isoleucine, leucine, lysine, and threonine (perfusate 2). Serum concentrations of gastric inhibitory polypeptide and insulin were significantly greater in the group receiving perfusate 2 ($p<0.001$). In contrast, after administration of amino acid perfusate 1, there was only a slight increase in serum gastric inhibitory polypeptide concentration, and insulin secretion increased only slightly. Mean trypsin and bilirubin outputs in the group receiving perfusate 1 were nearly 3 times greater than the outputs of the group receiving the other amino acid mixture. This study expands the importance of intraduodenal amino acid mixtures in stimulating secretion of gastric inhibitory polypeptide and insulin and quantitatively separates gastric inhibitory polypeptide release from release of hormones that stimulate pancreatic enzyme secretion, such as cholecystokinin.

6627 INHIBITORY ROLE OF THE DISTAL SMALL INTESTINE ON THE GASTRIC SECRETORY RESPONSE TO MEALS IN MAN. (Eng.) Clain, J. E.; Go, V. L. W.; Malagelada, J. R. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 74(4):704-707; 1978.

The role of the distal small intestine in postprandial gastric function was investigated in six healthy subjects by diverting chyme from the intestine at a site 100 cm distal to the ligament of Treitz and comparing the results with those observed in the same subjects when chyme was exposed to the entire gut. Diversion of chyme significantly increased ($p<0.02$) gastric secretory volume and acid output during the first postprandial hour by an average of 78% and 70%, resp.; the increase in acid output during ileal diversion occurred during the first postprandial hour in every subject studied. The pH of the gastric contents in the diversion studies was consistently lower than that in the chyme exposed to the entire gut ($p<0.01$) between 20 min and 4 hr postprandially. The increased secretory volume and acid output in the first postprandial hour resulted in greater intragastric volume ($p<0.01$) and acid content ($p<0.05$) throughout the study period, whereas emptying of gastric contents and acid was similar in the control and diversion experiments. The results demonstrate that the distal small intestine has an inhibitory role in postprandial gastric secretion.

6628 CELLULAR MECHANISMS OF GASTRIC HYPERSECRETION IN PYLORUS-LIGATED RATS. (Eng.)

Mozsik, G.; Beck, Z.; Fuzesi, Z.; Kiss, J.; Nagy, L.; Palotai, Z.; *et al.* (Univ. Medical Sch., H-7643 Pecs, Hungary). *Acta Physiol. Scand.* (Suppl.):187-198; 1978.

The effects of epinephrine, theophylline, Degranol®, actinomycin D, tetracycline, ATP, ADP, AMP, cyclic 2'3'-AMP, and cyclic 3'5'-AMP (cAMP) on the gastric secretory responses of pylorus-ligated rats were studied to determine cellular mechanisms of gastric hypersecretion. The tissue levels of mucosal ATP, ADP, AMP, cAMP, lactate, and pyruvate were measured. Gastric hypersecretion in pylorus-ligated rats was inhibited dose-dependently by epinephrine, theophylline, Degranol®, actinomycin D, tetracycline, ADP, AMP, cyclic 2'3'-AMP, and cAMP. The plasma immunoreactive gastrin level did not change at different times (2, 4, 7, and 16 hr) after pylorus ligation. The tissue contents of ATP, cAMP, and lactate were significantly decreased within 2-4 hr after pylorus ligation ($p<0.001$), while the tissue levels of ADP and AMP significantly increased in that time ($p<0.001$). The increased tissue level of mucosal ADP was prevented by atropine, epinephrine, atropine plus theophylline, epinephrine plus theophylline, and histamine. The decreased mucosal level of cAMP that occurred within 4 hr after pylorus-ligation was elevated by theophylline, epinephrine, atropine plus theophylline, and epinephrine plus theophylline, but not by histamine or histamine plus theophylline. It is concluded that (1) an increase in DNA-dependent RNA synthesis, *de novo* DNA synthesis, and protein translation are needed for the development of gastric hypersecretion, (2) gastric hypersecretion in pylorus-ligated rats is an ATP-dependent process, and (3) the development of gastric hypersecretion is associated with an increase in ATP transformation to ADP and with a decrease in ATP transformation to cAMP. The blockage of gastric hypersecretion is therefore associated with a decrease in ATP transformation to ADP and with an increase in ATP transformation to cAMP. It is postulated that an extra- and intracellular feedback mechanism system exists between the ATP-ADP (membrane ATPase) system and the ATP-cAMP (adenylate cyclase) system of the gastric mucosa.

6629 EFFECT OF HISTAMINE H_1- AND H_2-RECEPTOR BLOCKADE ON CANINE GASTRIC ACID SECRETION.

(Eng.) Barbezat, G. O.; Bowey, F. S. B.; Kaplan, E. R.; Hickman, R. (Groote Schuur Hosp., Observatory, 7925, Cape Town, South Africa). *Am. J. Dig. Dis.* 23(3):222-224; 1978.

To unmask any H_1-receptor sites on parietal cells, a study was carried out to determine whether simultaneous administration of histamine H_1- and H_2-receptor antagonists had any greater effect on histamine-stimulated gastric secretion in the dog than did either of these substances given alone. Two dogs with gastric fistulae and Heidenhain pouches given only fluids for 18 hr received histamine (160 μg/kg/hr, i.v., by continuous infusion) throughout all tests. After 1.5 hr, a bolus injection of mepyramine (25 mg), metiamide (0.6 mg/kg), mepyramine and metiamide together (same doses), or saline (control) was given; six studies were done with each dose at least 72 hr apart. Secretions were collected every 15 min for 2 hr. Metiamide (an H_2-receptor antagonist) significantly inhibited histamine-stimulated gastric secretion in both the gastric fistula ($p<0.01$) and Heidenhain pouch ($p<0.001$). Mepyramine (an H_1-receptor antagonist) had no significant effect on gastric secretion either alone or in combination with metiamide. Two dogs with gastric fistulas received either mepyramine (25 mg, i.v., as a bolus followed by 12.5 mg over 250 min), metiamide (0.6 mg/kg/hr), mepyramine plus metiamide in the same doses, or saline. After 10 min, an i.v. histamine infusion was begun and the dose doubled every 40 min (10, 20, 40, 80, 160, and 320 μg/kg/hr). The dose-response curve of inhibition by metiamide and mepyramine was virtually superimposable on that for metiamide alone, confirming the results of the first study. The inhibition by metiamide appeared to be competitive. There is no evidence in these studies for the presence of histamine H_1-receptor sites on the gastric parietal cell.

6630 BIOAVAILABILITY OF CIMETIDINE IN MAN.

(Eng.) Walkenstein, S. S.; Dubb, J. W.; Randolph, W. C.; Westlake, W. J.; Stote, R. M.; Intoccia, A. P. (Smith Kline Corporation, 1500 Spring Garden St., Philadelphia, PA 19101). *Gastroenterology* 74(2):360-365; 1978.

The bioavailability of parenteral cimetidine was tested in 12 volunteers in a balanced three-way crossover study. Blood levels and urinary excretion were compared after i.m., i.v., and p.o. administration of 300 mg of cimetidine. The i.m. and i.v. routes were found to be virtually interchangeable for parenteral cimetidine. The p.o. liquid, although exhibiting a reduced area under the blood level curve as compared with the parenteral doses, nevertheless demonstrated equivalence with respect to the time the blood level remained above 0.5 μg/ml. In another group of 12 volunteers the 300-mg cimetidine tablet formulation was found to be bioequivalent to a 300-mg dose of p.o. liquid.

6631 EFFECT OF CIMETIDINE ON INTRINSIC FACTOR AND PEPSIN SECRETION IN MAN. (Eng.)

Binder, H. J.; Donaldson, R. M., Jr. (Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT 06510). *Gastroenterology* 74(2, Part 2):371-375; 1978.

The effect of two doses of cimetidine on betazole-stimulated gastric acid, pepsin, and intrinsic factor secretions was evaluated in 15 normal men. The p.o. administration of 300 mg of cimetidine resulted in significant decreases in betazole (1.5 mg/kg)-stimulated volume secretion ($p<0.05$), acid concentration ($p<0.001$), gastric acid output ($p<0.001$), and pepsin output ($p<0.01$), and it completely inhibited the increase in pepsin concentration, intrinsic factor concentration, and intrinsic factor output caused by betazole. A 200-mg cimetidine dose significantly inhibited gastric volume secretion ($p<0.05$), intrinsic factor output ($p<0.01$), gastric acid output ($p<0.02$), and pepsin output ($p<0.05$); the change in gastric acid output was not evident until 45 min after betazole administration, and the change in pepsin output was only seen during the last 45 min of observation. The diminished pepsin secretion observed with cimetidine may be merely a consequence of diminished acid secretion. Because this drug inhibits betazole-stimulated intrinsic factor secretion, and, in at least one previous study, pentagastrin-stimulated intrinsic factor secretion, it may be important to monitor the long-term effects of this agent on intrinsic factor production and on vitamin B_{12} absorption.

6632 EFFECT OF CIMETIDINE ON GASTRIC SECRETORY FUNCTION DURING STRESS.

(Eng.) Levine, B. A.; Sirinek, K. R.; Teegarden, D. K.; McLeod, C. G.; Pruitt, B. A. (U.S. Army Inst. Surgical Res., Fort Sam Houston, TX 78234). *J. Surg. Res.* 24(3): 178-181; 1978.

Cannulated female C-D rats were divided into two groups, stress (30 animals) and no stress (24 animals), each of which were subdivided equally into cimetidine-treated (20 mg/kg, i.p.) and control (saline-treated) subgroups to define the effect of cimetidine on gastric acid production in this awake model previously shown to produce acute, stress-related, gastric mucosal injury. Gastric secretions were collected for 4 hr in each group. Cimetidine significantly reduced the mean volume of gastric juice in nonstressed rats (from 0.72 ± 0.07 ml/hr in controls to 0.44 ± 0.03 ml/hr, $p<0.01$), but there was no significant difference in gastric output volume between control and cimetidine-treated stressed rats (0.32 ± 0.04 and 0.42 ± 0.04 ml/hr, resp.). Cimetidine significantly reduced gastric acid concentration in both the stressed (from 57.17 ± 6.56 to 17.29 ± 1.94 mEq/l, $p<0.01$, for controls and cimetidine-treated rats, resp.) and nonstressed groups (from 63.38 ± 3.68 to 50.80 ± 3.90 mEq/l, $p<0.05$). Cimetidine significantly reduced total acid output from that in control animals in both trials (from 47.22 ± 6.39 to 23.42 ± 2.82 μEq/hr, $p<0.01$, in unstressed rats, and from 18.54 ± 3.41 to 7.80 ± 3.37 μEq/hr, $p<0.01$, in stressed rats). Total acid output in the stressed control rats was significantly lower than in nonstressed controls ($p<0.01$), but unchanged from that seen in the unstressed cimetidine group. It is concluded that gastric acid concentration is more important than total acid output in formation of stress-related gastric mucosal injury and that cimetidine's protective role in stress is related to its ability to decrease gastric acid concentration.

6633 THE EFFECTS OF CIMETIDINE ON HEALING OF CHRONIC GASTRIC AND DUODENAL ULCERS IN DOGS.

(Eng.) Okabe, S.; Takeuchi, K.; Murata, T.; Urushidani, T. (Kyoto Coll. Pharmacy, 5 Goryo Nakauchi, Yamashina, Kyoto 607, Japan). *Am. J. Dig. Dis.* 23(2):166-168; 1978.

Studies were carried out to confirm previous reports that cimetidine accelerates healing of chronic gastric and duodenal ulcers. Gastric ulcers were produced in dogs by the subserosal injection of acetic acid solution and duodenal ulcers by topical application of acetic acid on the serosal surface of the duodenum. The dogs received cimetidine p.o. (450 mg/day) in three divided doses for 14 days. Although cimetidine had no significant effect on gastric ulcer healing, it produced a remarkable acceleration of healing of duodenal ulcers, compared with that in untreated controls ($p<0.001$). An apparent and relatively deep ulcer was observed in all 10 nontreated controls, whereas 4 of 10 treated dogs had a completely healed duodenal ulcer. These studies demonstrate that cimetidine treatment markedly accelerates duodenal ulcer healing.

6634 METIAMIDE: MORE THAN AN H_2-RECEPTOR ANTAGONIST.

(Eng.) Simay, D. A.; Peskin, G. W.; Saik, R. P. (Veterans Admin. Hosp., La Jolla Village Drive, San Diego, CA 92161). *Am. J. Dig. Dis.* 23(2):169-172; 1978.

To investigate the mechanism of action of metiamide on acid secretion, the effect of this drug on acid secretion and calcium uptake by the frog gastric mucosa was tested alone and in combination with histamine, pentagastrin, aminophylline, and dibutyrl cyclic AMP (db cAMP). Although metiamide (10^{-4} M) reduced the acid secretory rate stimulated by 5×10^{-5} M and 10^{-3} M histamine, the percent increase at the lower dose of histamine was not significantly different from that in the controls. This inhibition by metiamide of the lower dose of histamine was overcome by increasing the histamine concentration, suggesting that metiamide is an H_2-receptor antagonist with competitive dynamics. Pentagastrin, on a molar comparative basis, was a more potent stimulant of acid secretion than was histamine, causing a 178.9% increase at 2×10^{-6} M, suggesting that a separate receptor site is involved in pentagastrin-induced acid stimulation. Aminophylline (10^{-3} M) and db cAMP (10^{-3} M) stimulated acid secretion by 340.7% and 314.6%, resp. Metiamide inhibited acid secretion by both aminophylline (-12.1% at 10^{-3} M and -7.8% at 2×10^{-2} M aminophylline, not significant) and by db cAMP (-37.9% at 10^{-3} M, $p<0.05$), suggesting that metiamide is more than an H_2 blocker. Since these agents stimulate intracellularly, at a site beyond the adenylate cyclase membrane receptor complexes, it appears that metiamide also inhibits actively within the cell. Metiamide inhibition was overcome by markedly increasing the dose of db cAMP to 8×10^{-3} M. Calcium influx was increased by histamine, pentagastrin, and aminophylline administration to the same degree. Although db cAMP increased acid secretion, it did not increase calcium influx, suggesting that increased cellular activity alone is not the cause of calcium uptake. Metiamide, even while inhibiting acid secretion, caused a significant increase in Ca^{2+} uptake as well ($p<0.005$). Metiamide caused increases in stimulated Ca^{2+} uptake into the parietal cell. The results suggest that metiamide actively inhibits acid secretion at a point within the cell beyond the adenylate cyclase membrane receptor complexes. Its effect on calcium influx may be another mechanism of inhibition.

6635 CANCER RISK OF THE STOMACH RESECTED FOR ULCER. THE ROLE OF DUODENOGASTRIC REFLUX IN DIFFERENT GASTROENTERAL ANASTOMOSES.

(Ger.) Dahm, K.; Eichen, R.; Mitschke, H. (Abteilung Allgemeinchirurgie, Chirurgische Universitatsklinik, Martinistr. 52, D-2000 Hamburg 20, W. Germany). *Langenbecks Arch. Chir.* 344(2):71-82; 1977.

The effect of duodenogastric reflux on the carcinogenic activity of orally administered *N*-methyl-*N'*-nitro-*N*-nitrosoguanidine (NG, 120 mg/l in drinking water) was studied in male Wistar rats. Gastric resection with short-loop gastroenteric anastomosis (Billroth II) was prepared in 39 rats (group 1); this anastomosis provided for continuous duodenogastric reflux. Gastric resection with Roux-en-Y anastomosis was performed in 33 rats (group 2); this anastomosis caused the passage of bile and pancreatic juice into the jejunum without its coming into contact with the remaining part of the stomach. From the eighth postoperative week onward, the animals received drinking water with NG *ad libitum* and were sacrificed after 8.5 months. The incidence of tumors in the anastomosis region was 13/39 in group 1, 7/33 in group 2, and 5/27 in the nonoperated controls. The incidence of carcinomas was 11/39 in group 1, 7/33 in group 2, and 0/27 in the controls. Sarcomas were found in two animals in group 1 and in one control animal. Carcinomas of the anastomosis were found in 7/39 animals in group 1 and in 1/33 in group 2. Carcinomas of the small intestine were found in four and six animals in groups 1 and 2, resp. The findings indicate the substantial contribution of duodenogastric reflux to the development of carcinoma of the resected stomach.

6636 LYSINE ACETYLSALICYLATE INHIBITS THE PROTEIN SYNTHESIS IN THE RAT GASTRIC MUCOSA IN VIVO AND IN VITRO.

(Eng.) Pichl, J.; Mitznegg, P.; Subramanian, N.; Sprugel, W.; Domschke, W.; Estler, C. J. (Institut fur Pharmakologie und Toxikologie der Universitat Erlangen-Nurnberg, Universitatsstr. 22, D-8520 Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(1):52-54; 1978.

To elucidate a possible mechanism for the side-effects of lysine acetylsalicylate (LAS), the action of s.c.-administered LAS on protein synthesis of various organs was investigated in the rat, and to discriminate between direct and indirect actions of LAS, similar investigations on protein and nucleic acid synthesis were performed in isolated rat gastric mucosal tissue. Male Wistar rats that were starved for 24 hr received LAS (90-900 mg/kg, s.c.) and were killed 30 min or 2 hr later. Gastric mucosal protein synthesis was significantly ($p<0.001$) inhibited 30 min after a 90-mg/kg LAS dose, whereas the incorporation of ^{14}C-labeled precursors into tissue proteins in the duodenum and liver (997 ± 56 counts/min [cpm]/mg protein and 160 ± 21 cpm/mg protein, resp.) were not significantly different after the 900-mg/kg LAS dose from control values (1,014 ± 55 and 153 ± 13 cpm/mg protein, resp.). The incorporation of ^{14}C-labeled precursors into protein, ^{3}H-thymidine into DNA, and ^{14}C-orotic acid into RNA were studied in an *in vitro* preparation of gastric mucosa in the presence of 0.9-9 mg/ml LAS. LAS inhibited protein synthesis in a dose-dependent manner, but the values for ^{3}H-thymidine and ^{14}C-orotic acid incorporation were not different from control values. It is possible that the inhibition of translation by LAS could contribute to the potential ulcerogenic effect of acetylsalicylate and that parenteral administration of LAS would not protect the stomach from salicylate-induced side-effects.

6637 EFFECT OF n-METHYL-n'-NITRO-n-NITROSOGUANIDINE ON THE GASTRIC MUCOSAL BARRIER IN RATS.

(Eng.) Horowitz, I.; Toth, L. S.; Werther, J. L. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Am. J. Dig. Dis.* 23(6):510-512; 1978.

In the light of studies showing microscopic evidence of early inflammatory gastric mucosal damage after *N*-methyl-*N'*-nitro-*N*-nitrosoguanidine (MNNG) prior to the development of carcinoma, the gastric mucosal barrier to hydrogen ion (H$^+$) after MNNG administration in the rat stomach was studied. Increased H$^+$ back-diffusion was observed 3 hr after p.o. doses of 1 mg of MNNG over a 3-day period. MNNG in concentrations of 250 µg/ml, 167 µg/ml, 86 µg/ml, and 50 µg/ml in the presence of acid caused increased H$^+$ back-diffusion across the gastric mucosa within 1 hr. Gastric mucosal barrier disruption by MNNG may play a pathogenic role in gastric carcinogenesis.

6638 THE RATE OF GASTRIC SECRETION OF HYDROGEN IONS.

(Rus.) Kanishchev, P. A.; Kovalenko, L. G. (Dnepropetrovsk Scientific Res. Inst. Gastroenterology, Dnepropetrovsk, USSR). *Lab. Delo* (12):707-712; 1977.

6639 THE ASSESSMENT OF THE ANTIPEPTIC EFFECT OF ULCER THERAPY.

(Eng.) Massewitsch, C.; Gorschkow, W. (Inst. Gastroenterology, Orbeli 22-21, Leningrad K223, USSR). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):452-455; 1977.

6640 PROPHYLACTIC EFFECT OF SOMATOSTATIN ON STRESS ULCER FORMATION IN RATS.

(Eng.) Zierden, E.; Hengst, K.; Hossdorf, Th.; Wagner, H.; Gerlach, U. (Medical Clinic and Polyclinic, Univ. Munster, Westring 15, 4400 Munster/Westf., W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):447-451; 1977.

6641 H^+ TRANSPORT BY A NON-ELECTROGENIC GASTRIC ATPase AS A MODEL FOR ACID SECRETION. (Eng.) Sachs, G. (Lab. Membrane Biology, Univ. Alabama in Birmingham, Birmingham, AL). *Rev. Physiol. Biochem. Pharmacol.* 79:133-162; 1977.

6642 ULTRASTRUCTURAL CHANGES AND CYCLIC AMP IN FROG OXYNTIC CELLS. (Eng.) Carlisle, K. S.; Chew, C. S.; Hersey, S. J. (Dept. Physiology, Emory Univ., Atlanta, GA 30322). *J. Cell. Biol.* 76(1):31-42; 1978.

6643 HYPERPLASIA OF SIMILAR AND DISSIMILAR MUCOSA ADJOINING GASTRIC MUCOSAL WOUNDS IN THE RAT. (Eng.) Wong, J.; Finckh, E. S. (Queen Mary Hosp., Hong Kong). *Pathology* 9(3):243-250; 1977.

6644 STEREOMICROSCOPIC AND ULTRASTRUCTURAL CHARACTERIZATION OF PROPIONITRILE-INDUCED DUODENAL ULCER IN THE RAT. (Eng.) Giampaolo, C.; Poulsen, S. S.; Szabo, S.; Reynolds, E. S.; Feldman, D. (Peter Bent Brigham Hosp., 721 Huntington Ave., Boston, MA 02115). *Lab. Invest.* 38(1):1-7; 1978.

6645 HISTAMINE H_2-RECEPTOR ANTAGONISTS. (Eng.) Feldman, M.; Richardson, C. T. (Univ. Texas Southwestern Medical Sch., Dallas, TX). *Adv. Intern. Med.* 23:1-24; 1978.

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6653 PRODUCTION OF GASTRIC ULCERS IN CATS BY INTRAVENOUS ACETAMINOPHEN PLUS HISTAMINE [Abstract]. (Eng.) Hansen, D. G.; Grossman, M. I. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA). *Clin. Res.* 26(2):110A; 1978.

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6664 INFLUENCE OF METIAMIDE AND ATROPINE ON PEPSINOGEN SECRETION IN THE CONSCIOUS RA (Eng.) Szelenyi, I.; Thiemer, K. (Dept. Pharmacology, Pharma-Res., Chemiewerk Homburg, D-6000 Frankfurt am Main, W. Germany). *Experientia* 33(12):1620-1621; 1977.

See also, 6569, 6571, 6602, 6617, 6735, 6767, 6789
6839, 6859, 6878, 6885, 6904, 6914.

SECRETION AND METABOLISM

Pancreas

6665 SECRETORY FUNCTION OF ISOLATED CANINE PANCREAS PERFUSED WITH FLUOROCARBON EMULSION. (Eng.) Kowalewski, K.; Kolodej, A. (Surgical-Medical Res. Inst., Univ. Alberta, Edmonton, Alberta, Canada). *Surg. Gynecol. Obstet.* 146(3): 375-378; 1978.

To assess the suitability of fluorocarbon emulsion for simultaneous perfusion of the canine stomach and pancreas, a gastroduodenopancreatic block was isolated that preserved the arterial circulation of the pancreas and was perfused *ex vivo* with a fluorocarbon emulsion oxygenated *in vitro* and containing a simulated physiologic protein-free solution. Pancreatic secretion was stimulated by secretin or cholecystokinin given as constant infusions over 5-6 hr into the arterial circulation. The response of the pancreas was essentially identical to that observed under *in vivo* conditions or during the perfusion of the isolated pancreas with homologous blood. Clear pancreatic secretion was collected for the entire 5-6 hr in response to both secretin and cholecystokinin. Gastric secretion was yellowish and contained, after about 3 hr of perfusion, a white fluorocarbon sediment. After 5 hr of perfusion, gastric corpus edema was evident, but at no time during 6 hr of perfusion was pancreatic edema noted. The volume, bicarbonate concentration, total protein concentration, and Cl^- concentration were significantly higher ($p<0.001$) in the secretin-induced secretion than in the cholecystokinin-induced secretion. The secretory viabilit of the canine pancreas is well-preserved under the conditions used in this study.

6666 COMPARISON OF THE BIOLOGICAL POTENCY OF A NEW SYNTHETIC PREPARATION OF SECRETIN WITH THAT OF NATURAL PORCINE SECRETIN IN THE DOG. (Eng.) Gyr, K.; Kayasseh, L.; Rittmann, W. W.; Girard, J.; Stalder, G. A. (Kantonsspital Basel, Switzerland). *Gut* 19(5):355-357; 1978.

The biological activity of a new synthetic secretin on exocrine pancreatic secretion was compared with that of natural porcine secretin in conscious dogs with chronic gastric and duodenal fistulae. The dose-response curves of the two preparations were parallel and nearly identical. The variances of the data were reduced when the parameters of pancreatic secretory response were corrected for body weight. Equimolar amounts of synthetic secretin and natural secretin produced responses of volume and bicarbonate secretion that were not significantly different. It is concluded that the new synthetic secretin is useful for clinical and research purposes.

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6669 PANCREATIC GLUCAGON, ENTEROGLUCAGON AND GASTRIN RESPONSES TO FEEDING IN OBESE AND LEAN SUBJECTS [Abstract]. (Eng.) Connell, A. M.; Brown, P.; Fairman, M. J. (Univ. Cincinnati Medical Center, Cincinnati, OH). *Gastroenterology* 72(5, Part 2):1040; 1977.

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6671 IMPORTANCE OF LIPID METABOLISM IN THE EXOCRINE PANCREAS. SIGNIFICANCE OF PHOSPHATIDYLINOSITOL (PI) TURNOVER IN RESPONSE TO SECRETAGOGUES INDUCING CALCIUM EFFLUX [Abstract]. (Eng.) Christophe, J.; Calderon, P. (Free Univ. Brussels Medical Sch., Brussels, Belgium). *Ir. J. Med. Sci.* 146(Suppl. 1):5-6; 1977.

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6676 THE NEURAL CONTROL OF EXOCRINE AND ENDOCRINE PANCREAS. (Eng.) Tiscornia, O. M. (Sch. Medicine Buenos Aires, Buenos Aires, Argentina). *Am. J. Gastroenterol.* 67(6):541-560; 1977.

See also, 6748, 6749, 6750, 6763, 6785, 7044, 7045, 7048, 7053, 7058, 7175, 7208.

SECRETION AND METABOLISM

Hepatobiliary Tract

6677 DETERMINANTS OF FASTING AND POSTPRANDIAL SERUM BILE ACID LEVELS IN HEALTHY MAN. (Eng.) LaRusso, N. F.; Hoffman, N. E.; Korman, M. G.; Hofmann, A. F.; Cowen, A. E. (Mayo Clinic and Mayo Foundation, Rochester, MN 55901). *Am. J. Dig. Dis.* 23(5):385-391; 1978.

The relationship between serum levels of cholic acid conjugates measured by radioimmunoassay, bile acid absorption, and hepatic clearance was studied to define the determinants of fasting and postprandial serum bile acids in healthy man. Acute or chronic interruption of the enterohepatic circulation caused a significant decrease in basal serum levels of cholyl conjugates in both dogs and humans ($p<0.05$), while liquid or solid meals caused a marked and reproducible increase in serum cholyl conjugates (humans studied only, $p<0.05$). A temporal correlation was demonstrated postprandially or after i.v. cholecystokinin (0.0625 U/kg/min for 30 min) between intestinal transit of bile acids and simultaneous changes in levels of serum cholyl conjugates. The plasma disappearance of i.v. injected radiolabeled cholylglycine was shown to be unaffected by serum levels of endogenous cholyl conjugates. These data are consistent with the interpretation that, in the presence of normal hepatic function, the major determinant of serum bile acids is their rate of intestinal absorption.

6678 ROLE OF ADENOSINE 3',5'-MONOPHOSPHATE (CYCLIC AMP) IN CANINE BILE-SALT-STIMULATED CHOLERESIS. (Eng.) Kaminski, D. L.; Ruwart, M. J.; Deshpande, Y. G. (St. Louis Univ. Sch. Medicine, St. Louis, MO). *Surg. Forum* 28:409-411; 1978.

To determine whether cyclic 3',5'-adenosine monophosphate (cAMP) functions as an intracellular mediator of bile salt-stimulated increases in hepatic bile flow, the effects of various doses of sodium taurocholate on bile cAMP secretion were evaluated in dogs with chronic gastric and biliary fistulas. Sodium taurocholate was infused for 90 min at doses of 9, 19, 37, 74, 149, or 298 μmol/min after the endogenous bile salt pool had been depleted by total diversion for 60 min. Progressive increases in sodium taurocholate dose caused progressive increases in bile volume, bile salt concentration, and bile salt output. There was a dose-related decrease in cAMP concentration and output that plateaued at 149 μmol/min (782 ± 146 pmol/ml and 44 ± 9 pmol/min, resp.); cAMP concentration and output at 9 μmol/min taurocholate were 6,508 ± 503 pmol/ml and 89 ± 18 pmol/min, resp. The results suggest that bile salt-stimulated canalicular bile flow is not mediated by cAMP.

6679 BINDING OF CHOLIC ACID TO SOLUBLE PROTEINS FROM RAT LIVER. (Eng.) McClelland, M. J.; Smallwood, R. A.; Hoffman, N. E.; Hoogenraad, N. J. (Austin Hosp., Heidelberg 3084, Australia). *FEBS Lett.* 82(2):255-258; 1977.

The binding of cholic acid to cytoplasmic proteins from the rat liver was examined. Most of the labeled bile acid was in the nuclei/membrane (31%) and supernatant (52%) fractions. In the supernatant fraction, the percentage of ^{3}H-cholic acid bound to protein as determined by ultrafiltration varied between 30% and 45%. Over 98% of the ^{3}H-cholic acid applied to the Sephadex G-75 column eluted as a single peak, at an elution volume identical to that of free ^{3}H-cholic acid. Thus, ^{3}H-cholic acid did not remain bound to the supernatant protein during gel filtration. In contrast, the ^{3}H-cholic acid did not become separated from protein during ultrafiltration using a membrane with a normal molecular weight retention limit of 50,000 daltons. Supernatant fractions from the column showed two areas that bound ^{14}C-cholic acid, the first fraction corresponding to a molecular weight of approximately 65,000 daltons and the second to 30,000-40,000 daltons. After the removal of albumin by diethylaminoethane (DEAE) chromatography, the two fractions that bound cholic acid were still present at the same molecular weight, showing that there were at least two proteins other than albumin that bind cholic acid. Proteolytic digestion with pronase completely destroyed all binding in these fractions, and the biochemical tests were positive for protein and negative for carbohydrate, suggesting that the binding species are protein, not glycoprotein.

6680 EFFECTS OF CHLORPROMAZINE HYDROCHLORIDE AND ITS METABOLITES ON Mg^{2+}- AND Na^{+},K^{+}-ATPase ACTIVITIES OF CANALICULAR-ENRICHED RAT LIVER PLASMA MEMBRANES. (Eng.) Samuels, A. M.; Carey, M. C. (Univ. Texas Health Science Center at Houston, P.O. Box 20708, Houston, TX 77025). *Gastroenterology* 74(6):1183-1190; 1978.

Because chlorpromazine hydrochloride has been reported to inhibit bile salt-dependent (BSD) and -independent (BSI) bile flow in a predictable fashion in primates and because a significant fraction of BSI bile flow is postulated to depend upon the activity of a canalicular membrane Na^{+},K^{+}-ATPase, the effects of chlorpromazine hydrochloride and its metabolites on the ATPase activities of canalicular-enriched rat liver plasma membranes were examined. Chlorpromazine inhibited the activities of both Mg^{2+}- and Na^{+},K^{+}-ATPases with a linear dose-response relationship between 10 and 100 μM. The inhibition of Na^{+},K^{+}-ATPase was pH dependent, showing a maximal inhibition at pH 7.8. Over the pH range 7.0 to 8.2, the inhibition was significantly reduced with the addition of glutathione ($p<0.05$) and was augmented under experimental conditions (UV irradiation and peroxidase-H$_2$O$_2$, by from 41% to 98% and from 38% to 80%, resp.) that promote the formation of the chlorpromazine semiquinone free radical. The 7-hydroxychlorpromazine metabolite was as active an inhibitor as the parent drug; however, two sulfoxide metabolites, chlorpromazine sulfoxide and 7-hydroxychlorpromazine sulfoxide, were less effective inhibitors of Na^{+},K^{+}-ATPase. These data are consistent with the hypothesis that chlorpromazine cholestasis may be a result of a direct toxic effect on the ATPase activities of hepatic canalicular membranes. The results further suggest that if chlorpromazine cholestasis occurs through an interaction with canalicular membrane ATPases, the degree of cholestasis may well be influenced by the extent of the conversion of the drug to its more active (free radical) or minimally active (sulfoxide) metabolites and by the local environment (pH and glutathione concentration) of the canalicular membrane.

6681 THE EFFECT OF S-ADENOSYL-L-METHIONINE ON ETHYNYLESTRADIOL-INDUCED IMPAIRMENT OF BILE FLOW IN FEMALE RATS. (Eng.) Stramentinoli, G.; Gualano, M.; Di Padova, C. (BioResearch Co., I-20060 Liscate, Milano, Italy). *Experientia* 33 (10):1361-1362; 1978.

Because S-adenosyl-L-methionine (SAMe) is the methylating agent in the enzymatic methylation by catechol-*O*-methyl transferase (CMT), the effect of SAMe administration on the bile flow reduction caused by ethynylestradiol (EE) was examined in female Sprague-Dawley rats. Five groups of animals were treated as follows: group 1, 2.5 mg/kg EE for 3 days by gastric intubation; group 2, EE as before plus 10 mg/kg SAMe i.m. t.i.d. for 3 days; group 3, same as group 2 except 25 mg/kg SAMe; group 4, solvent for EE (control); and group 5, same as group 4 plus 25 mg/kg SAMe on same schedule as group 3 (control). Bile flow and bile salt concentration were determined after a 12-hr fast. Bile flow was slower in EE-treated rats than in either group of controls ($p<0.05$). Either dose of SAMe given with EE was capable of restoring bile flow to control values. The bile salt concentration was higher in EE-treated animals than in any other group ($p<0.01$), although the amount excreted did not change significantly. When the bile salt independent fraction of bile was calculated for the groups, a significant difference was observed between the value for EE-treated rats (0.49 µl/min/g liver) and that for controls (1.30 µl/min/g liver, $p<0.01$) and between the value for EE-treated rats and the values for rats treated with 10 mg/kg SAMe (1.15 µl/min/g liver) and 25 mg/kg SAMe (1.40 µl/min/g liver, $p<0.01$ for both). If bile flow during the first 30 min of collection is considered to be 100%, then the bile salt-independent fraction of bile water represents 66% of total bile flow in the controls, 39.2% in EE-treated rats, and 60 and 68%, resp., in rats treated with 10 or 25 mg/kg SAMe in addition to EE. These results are in good agreement with the hypothesis that the reduction of bile flow after EE administration may be associated with alteration of the canalicular water secretion into bile independently of the secretion of bile salts. It is postulated that SAMe exerts its effects by reducing the binding of methylated steroids to microsomal proteins in rat liver, perhaps by favoring the enzymatic methylation of the catechol estrogens by CMT.

6682 INDEPENDENCE OF BILE ACID AND OUABAIN HEPATIC UPTAKE: STUDIES IN THE NEWBORN RAT.

(Eng.) Klaassen, C. D. (Univ. Kansas Medical Center, Kansas City, KS 66103). *Proc. Soc. Exp. Biol. Med.* 157(1):66-69; 1978.

Studies were carried out in newborn and adult Sprague-Dawley rats to determine whether bile acids are transported by the same process that transports neutral organic compounds or steroids in the liver. The plasma taurocholic acid concentration 15 min after the i.v. administration of taurocholic acid (30 mg/kg) was approximately 6 µg/ml in rats 20 days of age and older, whereas the concentration was more than fourfold higher in 10-day-old rats. There was a marked decrease in the plasma concentration of taurocholic acid 15 min after its administration as the rats increased in age from 5 to 20 days, and the plasma concentration in the 5-day-old rats was significantly lower than that in the 10-day-old rats ($p<0.05$). The taurocholic acid concentration was measured in the plasma, liver, and intestine at 2, 5, 10, 20, and 30 min after its administration to 7- and 39-day-old rats. The plasma level of taurocholic acid was already significantly higher ($p<0.05$) in the 7-day-old than in the 39-day-old rats at 2 min after administration, suggesting a larger volume distribution. The difference between the newborn and adult became greater at the longer time intervals. The taurocholate concentration in the liver of the newborn rat was significantly higher than that in the adult at 5 min after administration and at all times thereafter ($p<0.05$). The ratio of hepatic taurocholic acid concentration to its concentration in the plasma in the newborn rat was significantly lower ($p<0.05$) than in the older animals at the 2-min interval but was similar to the adult rat at all times thereafter. The newborn rats excreted significantly less ($p<0.05$) taurocholate into the intestine than the adults at all times after administration except at 30 min. The slower plasma disappearance and biliary excretion of taurocholic acid in the newborn appears to be due largely to a less efficient transfer of taurocholic acid from the liver into the bile, while the liver/plasma concentration ratio of taurocholate in the newborn is similar to that in the adult. The fact that ouabain cannot be taken up and concentrated in the newborn rat liver suggests that taurocholic acid and ouabain are transported into the hepatocyte by different systems.

6683 INFLUENCE OF PENTAGASTRIN, CHOLECYSTOKININ AND CERULEIN ON BILE PRODUCTION IN THE RAT.

(Fre.) Dangoumau, J.; Balabaud, C.; Bussiere-Leboeuf, C.; Dallet-Duverge, F.; Noel, M. (Laboratoire de Pharmacologie, Universite de Bordeaux II, 3, place de la Victoire, F 33000 Bordeaux, France). *J. Pharmacol. (Paris)* 8(2):197-204; 1977.

The effects of pentagastrin, cholecystokinin, and cerulein (all possessing the same C-terminal tetrapeptide) on bile production were compared in 60 anesthetized male Wistar rats with acute biliary fistulas. When pentagastrin was perfused into the hepatic artery or portal vein (10 µg/100 g body weight/hr for 1 hr), there was no effect on bile flow. When cholecystokinin was perfused (1 U/100 g body weight/hr, for 1 hr) into the jugular vein, there was an average increase of bile flow of 23% (from 6.73 ± 1.14 to 8.28 µl/100 g body weight/min). The concentration and, to a lesser degree, the output of bile salts decreased significantly ($p<0.02$). The concentration of bicarbonates did not change, but their output increased significantly ($p<0.001$). Erythritol clearance increased significantly from 7.16 ± 1.19 to 8.2 ± 0.94 µl/100 g/min, $p<0.01$, and the bile to plasma erythritol concentration ratio decreased significantly from 1.03 ± 0.01 to 0.97 ± 0.03 ($p<0.02$). A cerulein perfusion into the jugular (2 µg/100 g body weight/hr, for 1 hr) caused an average increase of bile flow of 19% (from 7.62 ± 0.98 to 9.11 ± 1.70 µl/100 g body weight/min). The concentration and output of bile salts decreased significantly ($p<0.001$) and the bicarbonate output and concentration increased significantly ($p<0.001$). These results suggest that pentagastrin, cholecystokinin, and cerulein have different effects on bile production in rats, in spite of their similar structure. The rat is insensitive to the hormone pentagastrin. Although cerulein increases the bile flow, its effect is very variable. Cholecystokinin stimulates ductular secretion of bile, but it also may inhibit the eventual ductular reabsorption of water, Na^+, and Cl^- and increase ductular permeability to erythritol.

6684 INFLUENCE OF SECRETIN ON BILE PRODUCTION IN THE RAT. (Fre.) Balabaud, C.; Noel, M.; Dangoumau, J. (Laboratoire de Pharmacologie, Universite de Bordeaux II, 3, place de la Victoire, F 33000 Bordeaux, France). *J. Pharmacol. (Paris)* 8(2):191-196; 1977.

The effect of secretin on the rat was studied to clarify its physiological impact on bile production in this species. Anesthetized male Wistar rats were perfused for 30 min with a solution of NaCl (9 g/l) with the addition of secretin for 60 min (20 U/kg body weight/hr). In seven of eight rats perfused into the hepatic artery, the average bile flow increased significantly ($p<0.001$) from a basal value of 5.84 ± 0.64 to 6.81 ± 1.12 µl/100 g/min when secretin was administered. The concentration and biliary flow of bicarbonates also increased significantly (from 0.175 ± 0.019 to 0.256 ± 0.060 µEq/100 g/min, $p<0.01$). When secretin was perfused into the portal vein, bile flow rose significantly in seven of eight rats (from 5.46 ± 0.94 to 6.51 ± 0.80 µl/100 g/min); the concentration of bicarbonates essentially did not change, but their output rose markedly. When ^{14}C-erythrol was injected into the penial vein of seven rats, its clearance increased from 6.48 ± 0.76 to 6.79 ± 1.20 µl/100 g/min during the secretin administration; the rise was not significant. When secretin was infused into the jugular vein, it failed to induce an increase in bile flow or bicarbonate output. These results show that secretin has a very weak choleretic effect in the rat as compared to man or dog, even when given in very high doses.

6685 EFFECTS OF PORTACAVAL SHUNT ON BILE ACID METABOLISM IN DOGS. (Eng.) Kuo, J.; Pertsemlidis, D.; Panveliwalla, D. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY). *Surg. Forum* 28:402-403; 1977.

To investigate how the shunting of bile acid-rich portal blood into the systemic periphery affects hepatic synthesis and pool size of bile acids and to validate the isotope dilution method of Lindstedt, studies were performed before (control) and after end-to-side portacaval shunt was carried out in 12 female adult mongrel dogs. Studies were done in the steady state, i.e., in the absence of liver failure and with the maintenance of constant body weight. Cholecystokinin-stimulated bile was collected for 6-7 days after i.v. infusion of 10-15 µCi of ^{14}C-cholic or ^{14}C-chenodeoxycholic acid. The pool size of cholic acid was significantly decreased after shunt (from 1,720 ± 610 to 524 ± 134 mg, $p<0.001$). The synthesis of cholic acid declined significantly after shunt (from 701 ± 300 to 351 ± 137 mg/day, $p<0.01$). The fractional turnover rate for cholic acid increased significantly after shunt (from 0.421 ± 0.118/day to 0.705 ± 0.426/day, $p<0.001$). Cholic acid made up 80%, deoxycholic acid 18%, and chenodeoxycholic acid 2% of the total bile acid mass. In two control and two shunted dogs, a known dose of ^{14}C-24-cholic acid was given i.v. 12 hr prior to sacrifice, and postmortem chemical measurement of the cholic acid pool (percentage recovery of isotope and bile acid mass in the gallbladder, liver, and intestine) was compared with pool size estimates in premortem isoto dilution studies. The isotope dilution method underestimated pool size by 27-31% in three of the four dogs. Postmortem isotope recovery was more than 90%. It is concluded that the shunted liver is unable to accelerate bile acid synthesis in response to the increased fractional turnover and presumed diminution of bile acid return. The decline in hepatic bile synthesis may be due to hepatocyte dysfunction. The isotope dilution method appears to underestimate bile acid pool size.

6686 CHOLESTEROL KINETICS FOLLOWING PORTACAVAL SHUNT IN DOGS. (Eng.) Coyle, J. J.; Guzman, I. J.; Varco, R. L.; Buchwald, H. (Univ. Minnesota Medical Sch., Minneapolis, MN). *Surg. Forum* 28:404-405; 1977.

Because portacaval shunt (PCS) has been proposed as a therapy for type II homozygous hypercholesterolemia, a study was undertaken to determine cholesterol (CH) kinetics (pool size and production rate) in the dog 1 yr after PCS. Three mongrel dogs that had undergone end-to-end PCS 44 weeks previously and five control dogs, all of which were in CH steady state (stable plasma CH levels and stable weights) were given i.v. injections of ^{14}-CH, and the plasma CH specific activity was determined biweekly for 5 weeks. Analysis of the data permitted the determination of both the rapidly and slowly miscible CH pool sizes and of the CH production rate. There were no significant differences in these three parameters between the control and PCS animals. The only significant difference ($p<0.01$) between the two groups was that the plasma cholesterol level of the controls (157 mg/100 ml) exceeded that of the PCS animals (76 mg/100 ml). Three explanations for the hypocholesterolemic mechanism of PCS in the dog are suggested: (1) changes may occur in CH transport, a decrease may occur in lipoprotein synthesis, or an increase may occur in lipoprotein catabolism, (2) shifts may occur in the CH pool distribution that were not detected in this isotopic model, or (3) shifts may occur in the CH pool between the compartments of the rapidly miscible pool that are undetectable in measurements of the total pool.

6687 DECREASED CHOLESTEROL AND FATTY ACID SYNTHESIS FOLLOWING PORTACAVAL SHUNT. (Eng.) James, J. H.; Soeters, P. B.; Escourrou, J.; Fischer, J. E. (Massachusetts General Hosp., Boston, MA). *Surg. Forum* 28:397-399; 1977.

To examine the mechanism whereby portacaval anastomosis (PCA) reduces plasma levels of triglycerides and cholesterol (C), *in vivo* hepatic lipid synthesis was measured in the rat after PCA. PCA was performed in 32 female Sprague-Dawley rats and sham operation in 32 others; 2 weeks later, hormonal and absorptive effects were synchronized by a feeding schedule that lasted 2 weeks. On the day of the experiment, half of each group was fed and half was starved, each animal received $^{3}H_2O$ i.v., and animals were killed 0.5, 1, 2, or 4 hr after injection. Homogenized organs were examined for ^{3}H-labeled fatty acids (FA) and C. A significant reduction ($p<0.01$) in FA synthesis after PCA was seen at all times after injection of ^3H_2O in both fed and starved rats. FA synthesis was markedly stimulated by feeding, but this stimulation was reduced by PCA. Hepatic synthesis of C was significantly decreased ($p<0.01$) by PCA in the starved rats, but a significant reduction in the fed group with PCA was seen only at the 4-hr point ($p<0.01$). These results suggest that the diversion of portal flow from the liver by PCA leads to reduced hepatic substrate supply and hence to reduced FA synthesis. The reduced substrate supply may not be limiting for the synthesis of C after PCA, and other regulatory factors may be more important.

6688 EFFECT OF SUCROSE ON LIPOGENESIS OF RATS CHRONICALLY TREATED WITH ETHANOL. (Eng.)

Pennington, S. N.; Barakat, H. A.; Dohm, G. L.; Smith, C. P. (Sch. Medicine, East Carolina Univ., Greenville, NC 27834). *Experientia* 34(5):564-565; 1978.

To find a method of ethanol dosing that would allow normal weight gain, the effect of sucrose on lipogenesis was studied in male, alcohol-fed Holtzman rats. Fifteen animals received ethanol (4 g/kg/day) as a 50/50 (volume/volume) solution in normal saline by stomach tube, and 15 controls received saline alone. In another group, 15 animals received a mixture of 25% sucrose and 25% ethanol in water (weight/volume/volume) as their only source of fluid, and an equal number of controls received a 25% sucrose solution. At the end of 28 and 56 days, the livers and epididymal fat pads were removed and analyzed for several lipogenic enzymes in six animals from each of the four groups. Adipose tissue glucose-6-phosphate dehydrogenase (G6PDH), fatty acid synthetase (FAS), and citrate cleavage enzyme (CCE) activities were significantly elevated ($p<0.05$) after 28 days of ethanol treatment, in comparison with the levels in saline-treated controls; malic enzyme (ME) was also raised, but not significantly. Liver enzyme levels were unaffected, and only liver CCE was significantly elevated after 56 days of ethanol treatment. Ethanol plus sucrose treatment caused significant decreases in adipose and liver ME activity at 28 days, compared with those in animals treated with sucrose alone ($p<0.05$). At 56 days, sucrose plus ethanol treatment caused significant decreases ($p<0.05$) in all tissues of all enzymes studied except liver CCE. Sucrose alone caused 2- to 10-fold increases in all enzymes in all tissues, relative to saline-treated animals. The results show that, depending on whether sucrose is used in the control, ethanol can increase or decrease the activities of lipogenic enzymes, particularly in rat adipose tissue.

6689 EFFECT OF EXPERIMENTAL BILIARY OBSTRUCTION ON THE PLASMA AND ERYTHROCYTE LIPIDS OF THE GUINEA PIG AND ON PLASMA PHOSPHATIDYLCHOLINE-CHOLESTEROL ACYLTRANSFERASE ACTIVITY. (Eng.)

Owen, J. S.; Bruckdorfer, K. R.; McIntyre, N. (Royal Free Hosp. Sch. Medicine, 8 Hunter St., London WC1N 1BP, England). *Biochem. Soc. Trans.* 5(5):1330-1333; 1977.

The guinea pig was assessed as an experimental model to establish whether the increases in plasma phospholipid and unesterified cholesterol and the changes in erythrocyte lipid content and morphology that are seen in human biliary obstruction occur in this animal. Double ligation or sham-operation was performed on the common bile ducts of male Dunkley-Hartley guinea pigs, and animals were killed 2, 5, or 12 days later. There was also a group of nonoperated controls. The concentrations of plasma bile acids were significantly higher in operated animals at all three times compared with nonoperated controls ($p<0.001$): 295 ± 120, 328 ± 119, and 796 ± 56 nM at 2, 5, and 12 days, resp., compared with 14 ± 6 nM in controls. Total phospholipid and unesterified cholesterol levels were significantly higher ($p<0.01$) in operated animals only at 12 days (0.74 ± 0.16 mM versus 0.43 ± 0.02 mM in controls and 0.34 ± 0.02 mM versus 0.19 ± 0.03 mM in controls, resp.). The percentage of unesterified cholesterol was significantly higher in operated animals (32 ± 5, 30 ± 2, and 47 ± 15% at 2, 5, and 12 days, resp.; $p<0.05$, $p<0.01$, and $p<0.05$, resp.) compared with controls (23 ± 1%). The phosphatidylcholine-cholesterol acyltransferase activity in operated animals did not decrease compared with sham-ligated controls, although one of two 12-day postoperated animals did show a marked decrease. The RBC of the 12-day and two of the four 5-day postoperated animals showed abnormal morphology and appeared similar to the spur cells of human liver disease; these animals were also the only ones to show an increased RBC cholesterol/phospholipid ratio compared with controls, although in three of the four animals the increase was modest (6-10%). The phospholipid content and the composition of the individual phospholipids was not altered. No differences in osmotic fragility of RBC from operated and sham-operated animals was found. The lack of marked increases in plasma phospholipid or unesterified cholesterol concentrations might be due to only minor biliary regurgitation of phospholipid into the plasma owing to the presence of a distensible gallbladder. Ligation of the bile duct above the gallbladder in the guinea pig might therefore prove a more suitable model.

6690 DISSOCIATION BETWEEN RATE OF HEPATIC LIPOPROTEIN SECRETION AND HEPATOCYTE MICROTUBULE CONTENT. (Eng.)

Reaven, E. P.; Reaven, G. M. (Stanford Univ. Sch. Medicine, Palo Alto, CA 94304). *J. Cell Biol.* 77(3):735-742; 1978.

To further define the relationship between microtubules and hepatic very low density lipoprotein (VLDL) secretion, experiments were carried out to see if changes in hepatic VLDL secretion are associated with changes in hepatocyte microtubule or tubulin content. In acute experiments, VLDL secretion was increased by perfusion of isolated rat livers for 2 hr with varying concentrations of free fatty acids (FFA). Hepatic VLDL triglyceride (TG) secretion at perfusate FFA levels of 0.7 μEq/ml was threefold greater ($p<0.01$) than when livers were perfused without added FFA. However, no differences were observed in the content of microtubules in these livers: specifically, microtubules occupied 0.029% of hepatocyte cytoplasm in livers perfused without FFA and 0.030% of cytoplasm in livers perfused with FFA. In chronic experiments, rats were fed for 1 week with either standard rat chow or a hyperlipemic (sucrose/lard) diet. With the experimental diet, plasma triglyceride levels increased threefold over controls, and liver VLDL-TG production, as determined by [^{3}H]glycerol turnover studies, was 55% greater ($p<0.01$) than controls. However, microtubules occupied 0.027% of the cytoplasm of hepatocyte cytoplasm whether rats were on standard or hyperlipemic diets. Furthermore, the tubulin content of isolated hepatocytes did change, and represented 1% of hepatocyte soluble protein, irrespective of diet. These results suggest that increases in hepatic VLDL secretion can occur without any demonstrable change in hepatocyte assembled microtubule or tubulin content and raise questions as to the role played by microtubules in hepatic VLDL secretion.

6691 EFFECT OF PORTACAVAL SHUNT ON LIPOPROTEINS AND AMINO ACIDS IN MONKEYS.

(Eng.) Casali, R. E.; Nelson, C. A.; Read, R. C.; Campbell, G. S.; Morris, M. D. (Arkansas Sch. Medicine, Little Rock, AR). *Surg. Forum* 28:400-401; 1977.

To examine the effects of end-to-side portasystemic shunts (PCS) on total serum levels of cholesterol (C), triglycerides (T), α-lipoproteins (HDL), β-lipoproteins (LDL), and the ratio of branched-chain and aromatic amino acids (BCA/AA) in hypercholesterolemic cynomolgus monkeys, 13 monkeys were fed a diet containing 0.3 mg of C/kg/cal and 45% total calories as fat for 2 months. Then they were randomly distributed for sham operations or PCS after which serum levels of C, T, HDL, LDL, and BCA/AA were measured bimonthly. All of the animals survived and none has shown clinical signs of encephalopathy in 10 months of observation. There was no difference in total C, T, or LDL levels between the two groups. However, HDL levels were higher in animals with sham operations (33 mg/100 ml) than in animals with PCS (27 mg/100 ml), and the BCA/AA ratio was significantly lower ($p<0.001$) in animals with PCS (2.2 mg/100 ml, range 1.8-2.8 mg/100 ml) than in sham-operated animals (3.96 mg/100 ml, range 2.9-7.4 mg/100 ml). Each animal maintained a relatively constant BCA/AA ratio. In cynomolgus monkeys, PCS does not affect total serum levels of C, T, or LDL in dietary-induced hypercholesterolemia. The reduced ratio of BCA/AA in PCS was produced by a relative increase in AA with BCA remaining constant.

6692 DECREASE IN CHOLESTEROL AND PHOSPHOLIPID SECRETION INTO BILE INDUCED BY CHOLEPHILIC DYES IN HAMSTERS.

(Fre.) Dumont, M.; Erlinger, S. (Hopital Beaujon, F 92118 Clichy Cedex, France). *Gastroenterol. Clin. Biol.* 1(11):891-896; 1977.

The effect of cholephilic anionic dyes on the biliary lipid secretion of anesthetized male golden hamsters was studied. Bile flow and bile salt outputs remained unchanged when BSP (76-80 nmol/min/100 g), phenol-3,6-dibromophthalein disulfonate (DBSP, 90-93 nmol/min/100 g), and indocyanine green (ICG, 23-27 nmol/min/100 g) were added to a perfusion of sodium taurocholate into the common bile duct. Phospholipids were significantly decreased by BSP (57.6%, $p<0.01$), DBSP (47.2%, $p<0.05$), and ICG (26.6%, $p<0.02$). Cholesterol output was also decreased by BSP (70.9%, $p<0.01$), DBSP (60.9%, $p<0.05$), and ICG (44.7%, not significant). Similarly, the cholesterol saturation index of bile was significantly decreased by BSP ($p<0.01$) and DBSP ($p<0.05$) but not significantly decreased by ICG. The decreases were registered within 30 min of adding the dyes to the perfusate, and values started to rise again as soon as the dyes were stopped. These results suggest that cholephilic anionic dyes interfere with phospholipid and cholesterol secretion into the bile, possibly by altering micelle formation, and not by preventing their synthesis.

6693 LACK OF ENTEROHEPATIC CIRCULATION OF INTACT BILIARY PHOSPHATIDYLCHOLINE IN THE RAT.

(Eng.) Larsson, B.; Nilsson, A. (Medicinsk kemiska institutionen 4, Box 750, 220 07 Lund 7, Sweden). *Scand. J. Gastroenterol.* 13(3):273-275; 1978.

To determine the extent to which biliary phosphatidylcholine recirculates in bile, *in vivo*-labeled bile was obtained by injecting male white rats i.v. or i.p. with ^{14}C-palmitic acid or ^{3}H-palmitic acid mixed with an equimolar amount of KOH and 50-100 mg fat-free bovine serum albumin following bile duct cannulation. The infused radioactivity was recovered in phosphatidylcholine, chloroform-soluble compounds, and water:methanol-soluble compounds from bile collected over 6 hr, whether the injected compound was ^{14}C-palmitic acid (49.3 ± 5.5, 63.1 ± 5.4, and 36.9 ± 5.4%, resp.) or ^{3}H-palmitic acid (25.6 ± 7.7, 51.0 ± 17.4, and 49.0 ± 17.4%, resp.). When ^{3}H- and ^{14}C-labeled bile was infused intraduodenally into other rats prepared with bile fistulas, the average recovery of radioactivity in bile over 6 hr was 18.5 ± 8.8 and 8.4 ± 4.3%, resp., and the radioactivity recovered as phosphatidylcholine was 1.74 ± 0.80 and 0.10 ± 0.03%, resp. When ^{3}H-taurocholate was infused simultaneously with ^{14}C-bile, 68 ± 5.0% of the infused ^{3}H was recovered over 6 hr. Thus, the low recovery of biliary phosphatidylcholine was not due to disturbed enterohepatic circulation in the bile fistula rats. When ^{3}H-dipalmitoyl phosphatidylcholine was infused with the ^{14}C-bile, <0.2% of the infused ^{3}H was recovered as biliary phosphatidylcholine. Since the distribution of radioactivity in the labeled phosphatidylcholine molecules was not determined in the experiments with palmitic acid, the fate of the injected label cannot be stated. Hence, these results do not exclude a recirculation of phosphatidylcholine by a deacylation-reacylation cycle. The results do indicate that there is no significant enterohepatic circulation of intact biliary phosphatidylcholine. This conclusion is at variance with previously published results of other authors.

6694 PROTEIN COMPOSITION OF RAT BILE. (Eng.) Kakis, G.; Yousef, I. M. (Dept. Pathology, Univ. Toronto, Toronto, Ontario M5S 1A8, Canada). *Can. J. Biochem.* 56(5):287-290; 1978.

To determine whether there is an association between biliary lipids and peptides or proteins, bile proteins were quantitated and identified in rats during the 48 hr following bile duct cannulation. Both total biliary protein secretion and the protein polypeptide profiles remained constant throughout the 48-hr period. The bile acids secreted in the first 5 hr contained 3-30% deoxycholic acid, ursodeoxycholic acid, and hyodeoxycholic acid. These bile acids disappeared thereafter, and the bile acids secreted consisted mainly of cholic acid and chenodeoxycholic acid. α-Muricholic, β-muricholic, and 3α,6-ketocholanic acid secretion continued throughout the experiment but was highest during the first 5 hr. Non-sodium dodecyl sulfate polyacrylamide gel electrophoresis of the biliary proteins secreted at various times showed seven major bands accounting for 90% of the total protein secreted. Sodium dodecyl sulfate polyacrylamide gel electrophoresis showed about 25 polypeptide bands, their molecular weights ranging from $12\text{-}140 \times 10^3$. These results show that protein secretion and protein polypeptide profiles remain constant, while bile acid secretion fluctuates markedly in both quantity and composition. It is concluded that biliary protein secretion is probably not related to the biliary secretion of bile acids.

6695 THE EFFECT OF DIETARY PROTEIN DEFICIENCY ON ALBUMIN SYNTHESIS AND ON THE CONCENTRATION OF ACTIVE ALBUMIN MESSENGER RIBONUCLEIC ACID IN RAT LIVER. (Eng.) Pain, V. M.; Clemens, M. J.; Garlick, P. J. (London Sch. Hygiene and Tropical Medicine, London WC1E 7HT, England). *Biochem. J.* 172(1):129-135; 1978.

A messenger-dependent rabbit reticulocyte lysate system was used to test the hypothesis that the decrease of liver albumin synthesis in humans and rats on protein-deficient diets is due to decreased availability of translatable messenger RNA (mRNA). COBS Wistar rats were divided into four groups according to the following dietary regimens: group I, complete; group II, protein-free for 9 days; group III, protein-free for 2 days; and group IV, protein-free for 9 days, then refed for 2 days with complete diet. By measuring the accumulation of i.v.-injected radioactive leucine in albumin immunoprecipitates, the proportion of albumin synthesis to total hepatic protein synthesis *in vivo* was established at 15%; the values for each of the groups were 14.6 ± 0.50, 7.98 ± 0.62, 8.34 ± 0.52, and 12.7 ± 0.65, for groups I, II, III, and IV, resp. ($p<0.001$ for II and III compared with I; $p<0.05$ for IV compared with I; $p<0.001$ for IV compared with II). In the messenger-dependent reticulocyte lysate system and also in the same lysate without nuclease pretreatment, synthesis of albumin and synthesis of total protein were measured as functions of the amount of total cytoplasmic hepatic mRNA added to the mixtures (up to 4 μg/50 μl). In the untreated system, the little or no response to added mRNA was attributed to the extensive protein synthesis on endogenous mRNA. In the messenger-dependent system, results were expressed in terms of radioactivity incorporated into albumin and into total protein per μg of RNA added; only the group II results were significantly different ($p<0.005$) from the controls (group I). Polyacrylamide gel analysis revealed that almost all of the radioactivity in the immunoprecipitate comigrated with an albumin marker. In liver samples from group II rats, the concentration of albumin RNA was half that found in samples from the group I rats. In group IV samples, however, increases in albumin mRNA levels produced by refeeding were not statistically significant; this and other discrepancies between the *in vivo* and *in vitro* results are discussed. The results suggest that the availability of specific mRNA species may well be responsible for the nutritional regulation of albumin synthesis, but it is not known whether the reduced availability of translatable mRNA is a primary effect of protein deprivation or a secondary effect at the level of translation or secretion.

6696 THE EFFECT OF PROSTHETIC GALLSTONES ON TOTAL BILE ACID POOL SIZE IN DOGS. (Eng.) Thurston, O. G.; McDougall, R. M.; Walker, K. (Dept. Surgery, Univ. Alberta, Edmonton, Alberta, Canada). *Surg. Gynecol. Obstet.* 146(6):911-913; 1978.

To determine whether the small bile acid pool characteristic of patients with cholesterol gallstones is responsible for gallstone formation or whether the reverse is true, the effect of prosthetic gallstones on total bile acid pool size was studied in dogs. The pool size was determined (by injecting ^{14}C-cholic acid) before and 28 days after the implantation of one or more polymeric silicone and/or glass spherical prostheses. The total bile acid pool size was reduced in 9 of 10 dogs after the implantation of the prostheses. The mean pool size fell from 4.25 ± 0.44 g to 2.91 ± 0.31 g ($p<0.01$). Sham cholecystectomy without prosthesis implantation also produced a small decrease in bile acid pool size but was significantly less than the decrease noted with prosthetic stones ($p<0.05$). Bile acid ratios (of cholic acid, chenodeoxycholic acid, and deoxycholic acid) did not change after implantation. These findings suggest that the small total bile acid pool size in patients with cholesterol stones is a phenomenon secondary to the pathologic state of the gallbladder.

6697 VITAMIN C AND GALLSTONE FORMATION: A PRELIMINARY REPORT. (Eng.) Jenkins, S. A. (Pye Res. Center, Walnut Tree Manor, Haughley Green, Suffolk IP14 3RS, England). *Experientia* 33(12):1616-1617; 1977.

An experiment was conducted to examine the relationships between vitamin C and gallstone formation. Male Dunkin-Hartley guinea pigs were fed a pelleted high cholesterol (0.5%) scorbutic diet for 5 weeks; 18 also received 0.5 mg L-ascorbic acid/day, p.o. (chronic hypovitaminosis C, group A) while 18 others received 5.0 mg L-ascorbic acid/day, p.o. (controls, group B). In group A, 14/18 animals survived at 5 weeks, had gained an average of 2.89 g, and all had gallstones, whereas in group B, 17/18 animals survived at 5 weeks, had gained an average of 25.67 g, and none had gallstones. The gallstones were found in the gallbladder and occasionally in the lumen of both the cystic and common bile ducts; the dried pooled gallstones weighed 18.96 mg, and 52.8% of this weight was cholesterol. The gallbladder bile of group A guinea pigs contained 8.99 ± 0.81 mM bile acids (BA) and 2.11 ± 0.12 mM cholesterol (C), values which were significantly different ($p<0.01$) from those of group B (14.54 ± 0.97 and 1.22 ± 0.17 mM for BA and C, resp.); however, the phospholipid (P) content was not significantly different between the two groups. Both the BA:C and P:C ratios in group A animals (4.4 and 3.7, resp.) were significantly different ($p<0.01$) from these ratios in group B animals (16.7 and 9.3, resp.), reflecting the higher C and lower BA content of group A bile. C is held in micellar solution in bile in combination with P and BA, and it has been postulated that the BA:C and P:C ratios determine the solubility of C rather than do absolute values. Thus, a lowering of these ratios favors the precipitation of C and provides a satisfactory explanation for gallstone formation in hypovitaminotic C guinea pigs.

6698 THE EFFECT OF ADRENALECTOMY UPON THE ABSORPTION, DISTRIBUTION AND METABOLISM OF ETHANOL IN THE RAT.

(Eng.) Powis, G.; Cummings, J.; Morgan, E. (Dept. Pharmacology, Glasgow Univ., Glasgow G12 8QQ, Scotland). *Life Sci.* 21(7):1033-1036; 1977.

To determine whether an altered absorption, distribution, or metabolism might enhance the toxicity of ethanol in adrenalectomized animals, male albino Wistar rats were adrenalectomized, ethanol was administered (1.0 g/kg, i.v. or 0.8 g/kg, i.p.), and blood samples were drawn at regular intervals for ethanol determinations, which were compared with control values. There was no significant difference between the peak blood ethanol levels in controls (74.5 ± 5.0 mg/100 ml) and in short-term (2-4 days before ethanol treatment) adrenalectomized rats (82.2 ± 6.3 mg/100 ml); the peaks occurred at 30 min. The peak blood ethanol level in long-term (8-14 days before ethanol treatment) adrenalectomized rats occurred at 15 min and was significantly higher than the control value (118.4 ± 1.7 mg/100 ml, $p<0.01$). The rate of ethanol metabolism did not differ significantly among the three groups. However, when the volume of distribution of ethanol and of antipyrine (10 mg and 5 μCi/kg, i.v.) were determined to measure total body water, there was a 20% reduction in total body water ($p<0.05$) in the long-term adrenalectomized rats compared with the controls. An increased rate of ethanol absorption and the decrease in total body water produced the increase in peak blood ethanol levels in long-term adrenalectomized animals. These two factors must be considered in addition to altered renal function, changes in cellular permeability, and decreased hepatic metabolism as variables that could alter the action of drugs in cases of adrenal hypofunction.

6699 THE EFFECT OF CERTAIN ANAESTHETIC AGENTS ON THE ACTIVITY OF RAT HEPATIC δ-AMINOLAEVULINATE SYNTHETASE.

(Eng.) Moore, M. R.; Parikh, R. K. (Univ. Glasgow Dept. Materia Medica and Therapeutics, Glasgow, Scotland). *Biochem. Soc. Trans.* 5(5):1473-1475; 1977.

The effect on rat hepatic δ-aminolevulinate synthetase (ALS) activity of various anesthetic agents was examined to determine if any of these drugs is porphyrinogenic. Rats were sacrificed after anesthetic treatment and their livers prepared for assay for ALS. The control level of ALS was 37.2 ± 15.2 nmol/hr/g of protein. Of 17 anesthetics tested, 7 caused increased ALS activity: thiopentone, 79.1 ± 20.0; methohexitone, 89.6 ± 28.3; althesin, 96.8 ± 22.6; chlordiazepoxide, 50.6 ± 12.4; pentazocine, 53.9 ± 13.0; ethrane, 53.8 ± 10.6; and methyoxyflurane, 53.3 ± 16.7 nmol/hr/g of protein. Barbiturate-based anesthetic drugs (thiopentone and methohexitone) could be expected to produce this effect based on previous evidence of porphyrinogenicity by barbiturates; a similar argument concerning steroids could explain the action of althesin. Pentazocine contains an allyl grouping, which is known to be porphyrinogenic in other compounds. The actions of chlordiazepoxide, methoxyfurane, and ethrane are difficult to explain; the former is known to inhibit electron transport and the second is known to cause hepatic artery spasm, which may play some part. Suc porphyrinogenic drugs should be avoided in the anesthetic management of porphyric individuals.

6700 INVESTIGATION ON THE MORPHOKINETIC REACTIONS OF THE RAT LIVER TO ETHER ANAESTHESI OF DIFFERENT DURATIONS.

(Ger.) Hildebrand, R.; Rucker, P. (Anatomisches Institut, Vesaliusweg 2-4, D-4400 Munster, W. Germany). *Anaesthesia* 25(10): 481-485; 1976.

The volumes of cell nuclei were measured in the central, intermediate, and peripheral zones of the liver lobules of adult male albino rats (specific pathogen-free Wistar TNO W 70 strain) during diethylether anesthesia lasting 15, 40, or 80 min. The mean nuclear volume in the central zone of the liver lobule was 128.26 μm^3 in the untreated controls, 128.61 μm^3 after 15-min anesthesia, 123.65 μm^3 after 40-min anesthesia ($p<0.001$), and 139.14 μm^3 after 80-min anesthesia ($p<0.001$). In the intermediate zone, the mean nuclear volume was 163. μm^3 in the controls, 156.94 μm^3 after 15-min anesthesia, 163.56 after 40-min anesthesia, and 172.61 μm^3 after 80-min anesthesia ($p<0.001$). In the peripheral zone of the hepatic lobule the mean nuclear volume was 129.73 μm^3 in the controls, and 114.09-121.36 μm^3 in the anesthetized groups ($p<0.001$). The results are interpreted by the typical distribution of cell organelles, enzymatic pathways, and metabolites in the different zones of the hepatic lobule. The intensity of the reaction and the onset of the diminution of the nuclear volume, indicating a functional depression and probably accentuated by a circulation-dependent low O_2 tension in the tissue, is interpreted in connection with different local concentrations of ether. An improvement of the blood flow by a locally increased metabolite level and an increased arterial influx presumably facilitate the recovery and favor a concentration-dependent induction of microsomal enzymes especially in the central zone of the hepatic lobule.

6701 STIMULATION OF LIVER REGENERATION BY CLOFIBRATE. (Eng.) Seifter, E.; Rettura, G.; Padawar, J.; Tolia, K.; Levenson, S. M. (Albert Einstein Coll. Medicine, Bronx, NY). *Surg. Forum* 28:395-397; 1977.

To examine the action of clofibrate, a compound known to produce nonfatty hepatomegaly, 32 adult male Sprague-Dawley rats were fed either a standard laboratory rat chow (groups 1A and 1B) or the same chow containing 2 g/kg clofibrate (groups 2A and 2B) for 3 days. Groups 1B and 2B were then subjected to 30% hepatectomy and groups 1A and 2A served as unoperated controls. Clofibrate increased liver size in controls (14.8 versus 12.6 g, $p<0.001$) and in the partially hepatectomized rats (13.4 versus 9.5 g, $p<0.001$). There were no changes in the proportions of liver protein, fat, or water due to clofibrate in either experimental or control rats. In a second experiment, 40 male Long-Evans rats were divided into 6 groups (2 with no surgery, 2 with sham operation, 2 with 30% hepatectomy with 1 group from each pair also receiving clofibrate). Clofibrate induced hepatomegaly in all three groups (liver weight 16.1 ± 1.0 versus 12.1 ± 0.6 g, 16.3 ± 0.6 versus 12.1 ± 0.4 g, and 14.0 ± 0.6 versus 10.7 ± 0.7 g, $p<0.003$, $p<0.001$, and $p<0.005$ for no surgery, sham operation, and partial hepatectomy, resp.). Clofibrate also increased the amounts of liver DNA, RNA, and protein and modestly increased the proportion of liver fat but did not increase the proportion of liver water in all three groups. It is hypothesized that clofibrate-induced hepatomegaly in normal animals occurs by an increase in cytoplasmic protein content, cell size, and either the number of nuclei/cell or the DNA content of the nuclei, whereas in partially hepatectomized rats, clofibrate causes a disproportionate increase in liver DNA, suggesting DNA synthesis or cell division.

6702 IN VIVO EFFECTS OF Escherichia coli ENDOTOXIN ON SULFOBROMOPHTHALEIN CLEARANCE IN THE GUINEA-PIG. (Eng.) Utili, R.; Abernathy, C. O.; Aron, S. A.; Zimmerman, H. J. (Veterans Admin. Hosp., Washington, DC 20422). *Experientia* 33(12): 1631-1632; 1977.

Since the incidence of cholestatic jaundice associated with gram-negative bacterial infections appears to be more prevalent in newborns than in adult humans, the effects of *Escherichia coli* endotoxin on the excretory processes of Hartley guinea pigs of different ages were studied. Lipopolysaccharide (LPS) from *E. coli* (35 µg/100 g) was administered i.p. to 1-, 3-, and 7-day-old animals, and 2 hr later, BSP (1.2 mg/100 g) was given by intracardiac injection. In saline-treated controls, BSP storage in the liver decreased between days 1 and 7, indicating maturation of hepatic conjugative processes. At 1 day, hepatic BSP accounted for about 21% of the applied dose, but at 3 and 7 days, only about 4%. In the experimental animals, LPS increased the percent BSP retention in the 1- and 3-day groups, but not in the 7-day group. At all ages, LPS caused an increased hepatic BSP storage, whether expressed in µg/g liver (136 ± 20, 95 ± 15, and 35 ± 6 µg/g liver in 1-, 3-, and 7-day-old animals, resp., versus 67 ± 20, 13 ± 3, and 14 ± 5 µg/g liver, resp., in controls) or as percentage of the applied dose (52 ± 5, 31 ± 5, and 11 ± 6%, resp., versus 21 ± 6, 4 ± 1, and 4 ± 5%, resp.). These results suggest that the primary effects of *E. coli* endotoxin on the hepatic clearance of BSP are at the excretory level.

6703 INFLUENCE OF SOME HEPATOTOXIC AGENTS ON HEPATIC GLUTATHIONE LEVELS IN MICE. (Eng.) Siegers, C. P.; Schutt, A.; Strubelt, O. (Medizinische Hochschule Lubeck, Lubeck, W. Germany). *Proc. Eur. Soc. Toxicol.* 18:160-162; 1977.

To determine whether hepatic glutathione (GSH) depletion is a reliable parameter of hepatotoxicity, hepatic levels of GSH and of oxidized GSH (GSSG) were determined in male NMRI mice 1 hr after p.o. treatment with CCl_4 (0.1 ml/kg), allyl alcohol (AA, 0.5 ml/kg), thioacetamide (TA, 50 mg/kg), dimethylnitrosamine (DMN, 150 mg/kg), bromobenzene (BB, 0.25 ml/kg), phenacetin (P, 1,000 mg/kg), and paracetamol (PA, 50 mg/kg), or after i.p. injection with diethylmaleate (DEM, 0.6 ml/kg). These levels were compared with those in controls (10 ml/kg saline, p.o.). The tested agents caused a depletion of hepatic GSH that, expressed as percentage decrease from control, amounted to 33.5% for CCl_4, 44.4% for AA, 26.8% for TA, 20.8% for DMN, 75.0% for BB, 60.1% for P, 90.1% for PA, and 81.6% for DEM. However, P and DEM did not induce hepatic lesions. The decreases in GSH levels were accompanied by corresponding decreases in GSSG levels. Pretreatment with DEM (0.6 ml/kg, i.p.) 1 hr prior to treatment with the hepatotoxins enhanced the toxicity of CCl_4, AA, BB, and PA as seen by the levels of serum enzymes (significant [$p=0.5$] increases in 2 of 3 measured enzymes in each case) and by enhanced mortality (2/12, 3/12, and 3/12 for AA, BB, and PA with DEM, resp., compared with 0/12 for each agent alone). DEM-induced GSH depletion is a useful experimental model to study the sensitivity of a GSH-depleted liver to hepatotoxic agents. Depletion of hepatic GSH is not a reliable parameter of hepatotoxicity.

6704 RAT HEPATOCYTES AND SINUSOIDAL CELLS. SIMULTANEOUS ISOLATION AND ACTIVITY OF UREA CYCLE ENZYMES. (Eng.) Kreusch, J.; Hofmann, F.; Maier, K. P.; Decker, K. (Biochemisches Institut an der Medizinischen Fakultat der Universitat Freiburg, Hermann-Herder-Str. 7, D-7800 Freiburg, W. Germany). *Hoppe Seylers Z. Physiol. Chem.* 358(11): 1513-1516; 1978.

A method for the simultaneous isolation of rat hepatocytes and sinusoidal cells from the same liver was developed and used to study the hepatic metabolism of urea. Hepatocytes were obtained from the slow-speed sediment following collagenase treatment of livers from female Wistar rats. Sinusoidal cells were obtained from the hepatocyte supernatant by incubation with pronase. When the initial centrifugation was carried out at 37 x *g* instead of 50 or 100 x *g*, the proportion of sinusoidal cells in the supernatant was high enough for efficient isolation (the ratio of sinusoidal cells to hepatocytes was 15.5). The lesser proportion of hepatocytes in the supernatant permits shorter incubations (45 min) with lower concentrations (0.15%) of pronase than were previously needed, and this has the advantage of destroying fewer sinusoidal cells. The yield of sinusoidal cells was 13.7 ± 0.6 mg (wet weight) with 14 ± 3 hepatocytes/10^4 sinusoidal cells. The leakage of lactate dehydrogenase and glutamate dehydrogenase activities from sinusoidal cells into the medium after 20 min of pronase incubation was 37% and 32%, resp., of the activity in the medium and sediment. Measurements of the activities of urea cycle enzymes in these cells revealed that the activities of carbamoyl-phosphate synthetase, ornithine carbamoyltransferase, arginosuccinate synthetase, arginosuccinate lyase, and arginase were similar in both kinds of cells but that the activity of ornithine-oxo-acid transaminase was markedly higher in sinusoidal cells than in hepatocytes (11.8 ± 4.2 versus 2.7 ± 2.5 nmol/min/mg protein). The decreased yield of sinusoidal cells by this method compared with the previous method is balanced by the ability to isolate both hepatocytes and sinusoidal cells simultaneously from the same liver. The study also confirms a previous report that the synthesis of urea occurs in sinusoidal cells as well as in hepatocytes.

6705 EFFECT OF THIOACETAMIDE ON LIVER MITOCHONDRIAL ENZYMES--CARBAMYL-P-SYNTHETASE AND ORNITHINE TRANSCARBAMYLASE. (Eng.) Feijoo, B.; Cascales, C.; Cascales, M.; Santos-Ruiz, A. (Facultad de Farmacia, Madrid, Spain). *Proc. Eur. Soc. Toxicol.* 18:262-264; 1977.

To better understand the pathogenesis of liver diseases, changes in the enzymes of the urea cycle in rat liver were studied following thioacetamide administration (TAM, 50 mg/kg/day, i.p., for 24-30 days) in male Wistar rats and compared with control values. The levels of ammonia and urea (expressed as μmol of ammonia/g of liver) in the livers of TAM-treated rats (710 ± 146 and 7,188 ± 155, resp.) were significantly different from the levels in controls (285 ± 32 and 8,995 ± 115, resp., $p<0.01$ for both). TAM produced a significant decrease ($p<0.001$) in the activities of carbamyl-P-synthetase, ornithine transcarbamylase, and arginase compared with control values (0.65 ± 0.2 versus 2.55 ± 0.15, 67.2 ± 4.8 versus 161.1 ± 19.5, and 2,088 ± 229 versus 3,367 ± 269 μmol/mg protein/hr, resp.) and a significant increase in glutamate dehydrogenase activity compared with the control value (23.2 ± 2.4 versus 13.95 ± 2.24 μmol/mg protein/hr, $p<0.01$). These results indicate a significant disturbance of the urea cycle; the inhibition of the urea cycle leads to an increase in the level of ammonia, which inhibits 2-oxoglutarate formation and, hence, glutamate formation. Thus, both mechanisms by which a cell protects itself from the toxic effects of ammonia accumulation (the urea cycle and glutamine formation) are compromised.

6706 THE EFFECTS OF INTRAVENOUS SODIUM OCTANOATE ON THE RHESUS MONKEY. (Eng.) Rabinowitz, J. L.; Staeffen, J.; Aumonier, P.; Blanquet, P.; Vincent, J. D.; Daviaud, R.; *et al.* (Philadelphia Veterans Admin. Hosp., Philadelphia, PA). *Am. J. Gastroenterol.* 69(2):187-190; 1978.

Experience with sodium octanoate-induced coma in primates is presented to assess the role of octanoate in hepatic encephalopathy. Five adult female Rhesus monkeys received sodium octanoate (5 mM/kg using a 0.625 M solution in isoosmotic NaCl adjusted to pH 7.35 with HCl, i.v., over a 10-min period). Two minutes after the beginning of infusion, muscular hypotony developed in all animals followed by the appearance of sleep characterized by slow, high-amplitude encephalographic waves. Slow (12/min) myoclonic movements then developed involving the entire body but with predominant activity in the extremities. This phenomenon was followed by a period of approximately 10 min in which there was almost complete muscle atony as in paradoxical sleep without eye movement; the electroencephalogram (EEG) registered 1.5 cycle/sec rhythmical activity. This phase was followed by a period of nonrhythmical EEG paroxyms occurring with bi- or triphasic wave patterns. Neck muscle activity slowly reappeared, followed by rapid eye movement and delta waves. The polygraph returned to normal 40 min after the beginning of infusion, at which time the EEG became desynchronized. In 190 octanoate determinations performed in 24 control subjects and 79 patients with cirrhosis of whom 50 were in some stage of hepatic encephalopathy, arterial and venous concentrations of octanoate were significantly higher in cirrhotic patients than in controls ($p<0.01$) and in cirrhotic patients in coma than in cirrhotic patients not in coma ($p<0.05$). Serum octanoate levels in cirrhotic patients were frequently above 10 μEq/l with a maximum level of 18 μEq/l (normal value, <5 μEq/l with a mean value cf 1.5 μEq/l). In comatose patients, there appeared to be a correlation between blood octanoate and ammonia levels.

It remains uncertain as to whether elevated serum octanoate level is a causative factor of hepatic encephalopathy or an incidental finding resulting from serious hepatic disease.

6707 THE RELATIONSHIP BETWEEN MEMBRANE POTENTIAL AND ATP CONTENT IN RAT LIVER DURING ISCHEMIA.

(Eng.) Shiba, Y.; Muneoka, Y.; Kanno, Y. (Sch. Dentistry, Hiroshima Univ., 2-3 Kasumi 1 Chome, Hiroshima 734, Japan). *Experientia* 15(1): 57-58; 1978.

To determine whether the decrease in the membrane potential of the liver caused by ischemia is explained by the ATP-depleting effect of ischemia, the effects of ischemia on the membrane potential and ATP content in the livers of ethionine-treated and untreated female Donryu rats were investigated. Ischemia was induced by occluding both the portal vein and common hepatic artery. DL-ethionine (75 mg/100 g) was injected i.p. 5.5 hr before ischemia was induced. The membrane potential and ATP content in the livers of untreated rats were -52.4 ± 3.6 mV and 2.43 ± 0.25 μmol/g wet liver, resp. These values decreased to -43.8 ± 4.4 mV and 0.44 ± 0.13 μmol/g wet liver, resp., in the ethionine-treated rats. Both ischemia and ethionine decreased the membrane potential and ATP content. In ethionine-treated liver, ischemia brought about a further significant decrease in membrane potential ($p<0.01$) without a significant decrease in ATP content ($0.1<p<0.2$). The results suggest that the decrease in the membrane potential by ischemia cannot be fully explained by its ATP-depleting effect.

6708 THE ACUTE PHASE RESPONSE TO INJURY AND ITS RELATIONSHIP TO CHANGES IN ENDOPLASMIC RETICULUM OF RAT LIVER.

(Eng.) Turchen, B.; Jamieson, J. C.; Huebner, E.; Van Caeseele, L. (Dept. Chemistry, Univ. Manitoba, Winnipeg, Manitoba R3T 2N2, Canada). *Can. J. Zool.* 55(9):1567-1571; 1977.

The ultrastructural changes that accompanied the acute phase response of serum proteins to experimental liver injury were investigated in male rats. The rats received an s.c. injection of either turpentine (0.5 ml/100 g) or 0.15 M NaCl and were killed 8, 12, 24, or 48 hr later. The induction of the acute phase response to injury was accompanied by dilation and loss of the regular structural features of the endoplasmic reticulum membranes. There were numerous circular or oval vesicles of rough and smooth endoplasmic reticulum. In most livers, there appeared to be increases in the amounts of smooth endoplasmic reticulum and Golgi complex relative to rough endoplasmic reticulum. These changes were present in all experimental animals, but were most noticeable in those with injury for 12-24 hr. The mean levels of sialyltransferase, galactosyltransferase, protein, RNA, phospholipid, protein-bound sialic acid, protein-bound galactose, albumin, and α_1-acid glycoprotein in the experimental animals at 24 hr (1,170 pmol/hr/mg protein [sialic acid transferred], 780 pmol/hr/mg protein [galactose transferred], 31.6 mg/g wet weight liver, 5.2 mg/g wet weight liver, 9.7 mg/g wet weight liver, 34.7 μg/g wet weight liver, 23.8 μg/g wet weight liver, 308.0 μg/g wet weight liver, and 280.0 μg/g wet weight liver, resp.) were increased in comparison with the levels in controls (650 pmol/hr/mg protein, 480 pmol/hr/mg protein, 27.8 mg/g, 4.8 mg/g, 7.2 mg/g, 25.5 μg/g, 18.0 μg/g, 389.0 μg/g, and 78 μg/g, resp.). It is suggested that the ultrastructural and biochemical changes in the liver result in part from an increased demand for liver synthesized glycoproteins.

6709 LONG-TERM EFFECT OF ARTERIALIZATION OF THE PORTAL VEIN ON THE SINUSOIDAL PRESSURE IN DOGS WITH PORTACAVAL SHUNT.

(Eng.) Arif, S.; Butt, K.; Dennis, C.; Lam, A.; Minkowitz, S.; Babich, A.; *et al.* (Downstate Medical Center, State Univ. New York, Brooklyn, NY). *Surg. Forum* 28:406-407; 1977.

Arterial flow into the portal vein after arterialization of the intrahepatic portal vein following portacaval shunt was monitored, and excessive perfusion was prevented by the choice of a small arteriovenous fistula, to determine the sinusoidal pressure in a chronic dog preparation. The hepatic vein wedge pressure (sinusoidal pressure) was determined manometrically preoperatively and at 2 weeks, 6 months, and 12 months postoperatively, and thereafter at 12- to 20-month intervals. In control dogs (portacaval shunt only), the mean preoperative sinusoidal pressure was 18.3 cm of saline; a slight decrease was observed after 2 weeks (16.4 cm), and in one dog that survived 6 months, the pressure was 12 cm. In 17 experimental dogs, the mean preoperative sinusoidal pressure was 17.4 cm of saline, and no abnormal elevations were seen during 56 months of follow-up. No significant changes in portal flow were observed up to 48 months, except in one animal in which a 2.63-fold increase in flow was measured after 24 months. The sinusoidal pressure did not change in this experimental preparation because the volume of blood entering the sinusoidal bed was similar to normal portal vein flow. Because the hemodynamics of the sinusoidal bed remained essentially unchanged, there was no damage to hepatic parenchyma.

6710 ENHANCEMENT OF THE ANTI-ANABOLIC RESPONSE TO ADENOSINE 3':5'-CYCLIC MONOPHOSPHATE DURING DEVELOPMENT: THE INHIBITION OF HEPATIC PROTEIN SYNTHESIS.

(Eng.) Klaipongpan, A.; Bloxham, D. P.; Akhtar, M. (Dept. Physiology, Univ. Southampton, Southampton SO9 3TU, England). *Biochem. J.* 168(2):271-275; 1977.

6711 S-ADENOSYLMETHIONINE METABOLISM AND ITS RELATION TO POLYAMINE SYNTHESIS IN RAT LIVER: EFFECT OF NUTRITIONAL STATE, ADRENAL FUNCTION, SOME DRUGS AND PARTIAL HEPATECTOMY.

(Eng.) Eloranta, T. O.; Raina, A. M. (Dept. Biochemistry, Univ. Kuopio, P.O. Box 138, SF-

70101 Kuopio 10, Finland). *Biochem. J.* 168(2): 179-185; 1977.

6712 PHARMACOKINETICS OF ^{14}C-DEMETHYLATION BREATH TESTS ANALYSED WITH GLYCODIAZINE AS MODEL SUBSTANCE [Abstract]. (Eng.) Bircher, J.; Platzer, R.; Karlaganis, G.; Galeazzi, R. L. (Dept. Clinical Pharmacology, Univ. Berne, Berne, Switzerland). *Digestion* 16(4):352-353; 1977.

6713 AN ELECTRICAL METHOD OF MEASUREMENT OF THE EXTRACELLULAR SPACE OF THE LIVER [Abstract]. (Eng.) Lambotte, L.; Wojcik, S. (Universite Catholique de Louvain, Laboratoire de Chirurgie Experimentale, Brussels, Belgium). *Digestion* 16(4):333; 1977.

6714 EFFECT OF BILE FLOW ON THE BILIARY REABSORPTION OF ^{35}S-SULFOBROMOPHTHALEIN SODIUM (^{35}S-BSP) FROM THE RAT BILIARY TREE [Abstract]. (Eng.) Dammann, H. G.; Butzow, G. H.; Grasedyck, K. (First Medical Clinic, Univ. Hamburg, Hamburg, W. Germany). *Digestion* 16(4): 341-342; 1977.

6715 HETEROGENEOUS RECIPROCAL LOCALIZATION OF FRUCTOSE-1,6-BIS-PHOSPHATASE AND OF GLUCOKINASE IN MICRODISSECTED PERIPORTAL AND PERIVENOUS RAT LIVER TISSUE. (Eng.) Katz, N.; Teutsch, H. F.; Jungermann, K.; Sasse, D. (Biochemisches Institut, Albert-Ludwigs-Universitat, D-7800 Freiburg, W. Germany). *FEBS Lett.* 83(2): 272-276; 1977.

6716 METABOLISM OF 2-DEOXY-D-GALACTOSE IN LIVER INDUCES PHOSPHATE AND URIDYLATE TRAPPING. (Eng.) Starling, J. J.; Keppler, D. O. R. (Univ. Florida Coll. Medicine, Gainesville, FL 32610). *Eur. J. Biochem.* 80(2):373-379; 1977.

6717 AUXILIARY LIVER TRANSPLANTATION IN THE RAT, INFLUENCE OF THE CONDITION OF THE RECIPIENT'S LIVER ON THE FATE OF THE GRAFT. (Eng.) Hess, F.; Willemen, A.; Jerusalem, C. (Lab. Cytology and Histology, Univ. Nijmegen, Geert Grooteplein Noord 21, Nijmegen, Netherlands). *Eur. Surg. Res.* 9(4):270-279; 1977.

6718 EFFECT OF DIETARY FATS ON OXIDATIVE PHOSPHORYLATION AND FATTY ACID PROFILE OF RAT LIVER MITOCHONDRIA. (Eng.) Divakaran, P.; Venkataraman, A. (Univ. Texas Medical Sch. at Houston, P.O. Box 20708, Houston, TX 77025). *J. Nutr.* 107(9):1621-1631; 1977.

6719 METABOLISM OF PROTEIN AND RNA IN LIVER OF RATS DEPRIVED OF TRYPTOPHAN. (Eng.) Bocker, R.; Jones, I. K.; Kersten, W. (Institut fur Physiologische Chemie, Universitat Erlangen-Nurnberg, Wasserturmstrasse 5, 8520 Erlangen, W. Germany). *J. Nutr.* 107(9):1737-1746; 1977.

6720 ALTERATIONS IN NICOTINAMIDE AND ADENINE NUCLEOTIDE SYSTEMS DURING MIXED-FUNCTION OXIDATION OF p-NITROANISOLE IN PERFUSED LIVERS FROM NORMAL AND PHENOBARBITAL-TREATED RATS. (Eng.) Kauffman, F. C.; Evans, R. K.; Thurman, R. G. (Univ. Maryland Sch. Medicine, Baltimore, MD 21201). *Biochem. J.* 166(3):583-592; 1977.

6721 IMMUNITY AND IMMUNOPATHOLOGY FOLLOWING REINFUSION OF MICE CURED OF CHRONIC SCHISTOSOMIASIS MANSONI. (Eng.) Warren, K. S.; Pelley, R. P.; Mahmoud, A. A. F. (Dept. Medicine, Case Western Reserve Univ., Cleveland, OH 44106). *Am. J. Trop. Med. Hyg.* 26(5, Part 1):957-962; 1977.

6722 CYTOCHROME P-450 IN BIOLOGICAL HYDROXYLATIONS IN THE LIVER. (Eng.) Trulzsch, D. (Luitpold-Krankenhaus, Josef-Schneider-Str. 2, D-8700 Wurzburg, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(4):302-306; 1977.

6723 SHORT-TERM HORMONAL CONTROL OF FAT METABOLISM IN THE LIVER. (Eng.) Hems, D. A. (St. George's Hosp. Medical Sch., London SW17 0QT, England). *Biochem. Soc. Trans.* 5(4):886-890; 1977.

6724 THE INFLUENCE OF THYROID STATE ON GLYCEROL INDUCED HYPERPOLARIZATION OF THE CELL MEMBRANES IN ISOLATED, PERFUSED RAT LIVER. (Eng.) Sestoft, L.; Folke, M.; Bartels, P. D.; Gammeltoft, S.; Kristensen, L. O. (Hvidore Hosp., Emiliekildevej DK-2930 Klampenberg, Denmark). *Biochim. Biophys. Acta* 469(2):163-170; 1977.

6725 THE EFFECT OF PHENOXYBENZAMINE AND SARALASIN ON THE ALTERED RENAL BLOOD FLOW DISTRIBUTION IN BABOONS WITH OBSTRUCTIVE JAUNDICE. (Eng.) Bomzon, L.; Kew, M. C.; Rosendorff, C. (Univ. Witwatersrand, Medical Sch., Hospital St., Hillbrow, Johannesburg, South Africa). *Clin. Exp. Pharmacol. Physiol.* 4(4): 365-373; 1977.

6726 INCREASED HEPATIC PRODUCTION OF α-AMINO-n-BUTYRIC ACID AFTER CHRONIC ALCOHOL CONSUMPTION [Abstract]. (Eng.) Shaw, S.; Lieber, C. S. (Bronx Veterans Admin. Hosp., Bronx, NY). *Gastroenterology* 73(5):1246; 1977.

6727 METHANETHIOL INHIBITION OF MITOCHONDRIAL RESPIRATION. (Eng.) Waller, R. L. (Dept Physiology, Case Western Reserve Univ., Cleveland, OH 44106). *Toxicol. Appl. Pharmacol.* 42(1):111-117; 1977.

728 LIVER GLYCOGEN STORAGE DISEASE IN AN INBRED STRAIN OF RATS. (Eng.) Malthus, . S.; Clark, D. G. (Univ. Otago Medical Sch., tago, New Zealand). *Proc. Univ. Otago Med. Sch.* 5(2):31-32; 1977.

729 EFFECT OF BOVINE SERUM ALBUMIN ON THE FUNCTIONAL CHARACTERISTICS OF ISOLATED ERFUSED RAT LIVER. (Eng.) Groufsky, A. K.; olland, R. K.; Lee, D. (Univ. Otago Medical Sch., tago, New Zealand). *Proc. Univ. Otago Med. Sch.* 5(2):26-27; 1977.

730 Schistosoma mansoni: CHOLESTERYL ESTER PROFILES OF PLASMA AND LIVER IN EXPERI- ENTALLY INFECTED MICE. (Eng.) De Oliveira, D. . G.; De M. Costa, J. C. (Departamento de Bioquimica, niversidade Federal de Pernambuco, 50,000 Recife, ernambuco, Brazil). *Exp. Parasitol.* 43(1):244-247; 977.

731 CYTOCHEMICAL LOCALIZATION OF GLUCOSE 6-PHOSPHATASE ACTIVITY IN THE LIVER OF ROWING MICE AFTER PHENOBARBITAL TREATMENT. (Eng.) anamura, S.; Ogawa, K. (Kansai Medical Univ., origuchi, Osaka 570, Japan). *Acta Histochem. ytochem.* 10(2):204-216; 1977.

6732 OPPOSITE CHANGES IN RAT LIVER GLUCOSE-6-PHOSPHATE DEHYDROGENASE DURING AGING IN SPRAGUE-DAWLEY AND FISCHER 344 MALE RATS. (Eng.) Wang, R. K. J.; Mays, L. L. (Dept. Biology, Occidental Coll., Los Angeles, CA 90041). *Exp. Gerontol.* 12(3/4):117-124; 1977.

6733 EFFECT OF VITAMIN A NUTRITIONAL STATUS ON THE RIBONUCLEIC ACIDS OF LIVER, INTESTINAL MUCOSA AND TESTES OF RATS. (Eng.) Jayaram, M.; Ganguly, J. (Dept. Biochemistry, Indian Inst. Science, Bangalore-560012, India). *Biochem. J.* 166(3):339-366; 1977.

See also, 6576, 6621, 6622, 6625, 6670, 6747, 6748, 6769, 6785, 6800, 7068, 7090, 7094, 7106, 7150, 7207, 7208, 7209, 7210.

SECRETION AND METABOLISM

Intestine

34 DISTRIBUTION OF INTRINSIC NERVE CELL BODIES AND AXONS WHICH TAKE UP AROMATIC AMINES D THEIR PRECURSORS IN THE SMALL INTESTINE OF THE INEA-PIG. (Eng.) Furness, J. B.; Costa, M. (Sch. dicine, Flinders Univ., Bedford Park, South Aus- alia, 5042, Australia). *Cell Tissue Res.* 188(3): 7-543; 1978.

e sites of uptake, decarboxylation, and retention L-dopa and the uptake and retention of dopamine d 6-hydroxytryptamine in the guinea pig small testine were localized histochemically with a uorescence technique for arylethylamines. In eal segments from untreated guinea pigs, only radrenergic axons were fluorescent; these axons re eliminated by surgical denervation (crushing rves running to the intestine through the mes- tery) or by chemical denervation with 6-hydroxy- pamine (300 mg/kg and 200 mg/kg, s.c., 1 week art). In denervated segments of ileum, cell bodies d processes of intrinsic neurons became fluorescent ter the injection of l-dopa (175 mg/kg), dopamine 0-200 mg/kg), or 6-hydroxytryptamine (20-100 mg/) and the inhibition of monoamine oxidase, as did lls of Brunner's glands and Paneth cells. About % of the nerve cell bodies in the submucous plexus and 0.4% of those in the myenteric plexus became fluorescent. Varicose intrinsic axons that took up amines were found among the nerve cell bodies of the myenteric and submucous plexuses. They also ramified in the principal connections of the plexuses, in the tertiary strands of the myenteric plexus, in the deep muscular plexus, and contributed sparse supplies of axons to arterioles in the submucosa and to the lamina propria of the mucosa. The axons were resistant to the degenerative actions of 6-hydroxydopamine. It is suggested that the intrinsic amine handling axons are more likely to utilize an indolamine related to 5-hydroxytryptamine than they are to utilize a catecholamine as a neurotransmitter.

6735 ACID RELEASES MOTILIN FROM HUMAN DUODENUM IN VITRO. (Eng.) Strunz, U.; Mitznegg, P.; Domschke, W.; Subramanian, N.; Domschke, S.; Wunsch, E. (Dept. Medicine, Univ. Erlangen-Nurnberg, Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):456-457; 1977.

The effects of hydrochloric acid and sodium hydroxide on human duodenal mucosa were studied using an *in vitro* perfusion technique to investigate the stimuli for motilin release. Motilin was measured by a sensitive and specific radioimmunoassay. The pH of the perfusate was adjusted either to pH 2 by addition of 1 N HCl or to pH 12 by addition of 1 N NaOH, and samples of the effluent were taken at timed intervals. The tissue was obtained from patients undergoing gastrectomy for chronic ulcer disease or gastric cancer. Under basal conditions (pH 7.5), 2.2 ± 0.3 fmol motilin/min/100 mg tissue were released into the medium. Alkalinization completely abolished this release. Acidification caused a peak release of 31.7 ± 3.1 fmol motilin/min/100 mg tissue after 1 min. Motilin levels remained markedly elevated for 40 min, whereas the pH returned to 7.5 within 2 min after addition of the acid. It is concluded that motilin secretion can be stimulated *in vitro* and that this perfusion system may be useful in studying the mechanism of gastrointestinal hormone release.

6736 INTESTINAL DISACCHARIDASES IN NEWBORN AND MOTHER RATS: EFFECT OF DIETARY PROTEIN DEFICIENCY DURING PREGNANCY.

(Eng.) Younoszai, M. K.; Swanson, J. D., Jr.; Ranshaw, J. (Coll. Medicine, Univ. Iowa, Iowa City, IA 52242). *Am. J. Clin. Nutr.* 31(6):931-937; 1978.

Small intestinal growth and disaccharidase activity were studied in mother rats fed a protein-deficient diet during pregnancy and in the pups. Pups were delivered at term, by cesarean section, from control (CP) and test (TP) rats. The diets fed during pregnancy contained 26% casein (CP rats) or 6% casein (TP rats). At birth, body weight and small intestinal length and weight were significantly lower in pups of TP than in those of CP rats ($p<0.01$). Specific activity of lactase in the small intestine was similar in the two groups of pups (mean 106 versus 116 μmol lactose hydrolyzed/min/g protein). However, total activity of lactase in the entire small intestine was significantly lower in the pups of TP than in those of CP rats ($p<0.01$). In the mothers, the weight of the small intestine in TP rats was almost half that in the CP rats (3.7 versus 7.6 g). In the mucosal scrapings of distal third of the small intestine, specific activities of the disaccharidases were significantly greater in TP than in CP rats (lactase, 15.0 versus 6.2; sucrase, 39 versus 21; maltase, 250 versus 152 μmol substrate hydrolyzed/min/g protein of mucosal homogenate). In the proximal third of the small intestine, only maltase activity was significantly ($p<0.05$) different (lactase, 12.0 versus 10.8; sucrase, 76 versus 61; maltase, 350 versus 258 μmol/min/g). Total activities of the disaccharidases in the small intestine were significantly lower ($p<0.05$) in the TP than CP rats (lactase, 4.0 versus 6.4; sucrase, 15 versus 28; maltase, 74 versus 125 μmol hydrolyzed/min, by mucosal scrapings of the entire intestine). This study did not indicate that in the small intestine specific activity of lactase was lower in the growth retarded than in the controls. However, total activity of lactase in the entire small gut was significantly lower because of the small size of the intestine in the former group.

6737 LACTASE ENZYMES IN THE INTESTINAL BRUSH BORDER MEMBRANE OF THE SUCKLING RAT: A SECOND ENZYME RESTRICTED TO ILEUM.

(Eng.) Green, J. R.; Hauri, H. P. (Univ. Children's Hosp., 3010 Bern, Switzerland). *FEBS Lett.* 84(2):233-235; 1977.

A specific assay for brush border membrane lactase was used to study the small intestine of 1- to 28-day-old rats. This study confirmed the developmenta differences in lactase activity reported in other studies. Lactase activity in the distal small intestine increased from an initial low level to reach a peak between days 8 and 16, after which it decreased and was totally absent by day 28; activit in the proximal intestine showed little change unti day 16 when it began to fall to approach adult values by day 28. The possibility that the proxima and distal lactases are not identical molecules was investigated by gel electrophoresis. A comparison of the protein and enzyme patterns showed that the lactase activity of suckling rats comigrates with a major protein band of relative front (R_F) 0.277 for the proximal enzyme and R_F 0.242 for the distal one To locate more precisely the change-over point between the proximal and distal lactases, the small intestines from rats aged 12, 14, 19, and 23 days were divided into eight sections of equal length and the brush border membrane proteins analyzed. From the R_F values, it was possible to classify the enzyme present in sections 1-6 as the proximal type and that in sections 7 and 8 as the distal type. In no section was the simultaneous presence of the two forms of the enzyme observed, and there was no evidence for a gradual change in mobility of any of the bands that would be expected if the observed differences were due to intraluminal proteolysis of a proximal protein to produce an electrophoretically faster distal form. The results demonstrate that there is a second type of lactase molecule restricted to the distal small intestine of the suckling rat.

6738 EFFECT OF ALLOXAN-INDUCED DIABETES ON INTESTINAL PEPTIDASES IN THE RAT.

(Eng.) Arvanitakis, C.; Folscroft, J.; Stitt, G. (Kansas Univ. Sch. Medicine, Kansas City, KS 66103). *Endocrinology* 102(4):1118-1121; 1978.

Inasmuch as amino acid transport is increased in diabetes and intestinal peptidases are important enzymes in the digestion and absorption of peptide and amino acids, the effect of experimental diabetes on representative membrane-bound and cytoplasmic peptidases was examined in the rat small intestine. Male Holtzman rats received either alloxan monohydrate (40 mg/kg) or normal saline (control) i.v., and 24-hr urine was collected and tested for glucose. Persistent glucosuria, hyperglycemia (blood glucose >250 mg/dl), and weight loss were the criteria for diabetes. There was no significant difference in daily food intake between the groups. On day 7 after treatment, the rats were sacrificed, and proximal and distal halves of the entire small intestinal mucosa were processed to obtain brush border and cytosol-fraction enzymes. Alloxan diabetes significantly increased the wet weight of the mucosal scrapings and total mucosal protein in both the proximal (from 2.25 ± 0.2 to 3.15 ± 0.4 g and from 0.214 ± 0.02 to 0.359 ± 0.02 g, resp., $p<0.01$) and distal segments (from 1.59 ± 0.2 to 2.26 ± 0.3 g and from 0.189 ± 0.01 to 0.268 ± 0.02 g, resp., $p<0.025$ and $p<0.05$, resp.). When the activities of leucyl-naphthylamidase (LNA), leucyl-glycine hydrolase (LGH), and prolyl-glycine hydrolase were assayed, there were no significant differences in cytosol fraction activities between control and diabetic rats, but the total and specific activities of LNA and LGH were significantly increased in both the proximal ($p<0.02$ and $p<0.05$, resp., for LNA; $p<0.05$ and $p<0.05$, resp., for LGH) and distal segments ($p<0.02$ and $p<0.02$, resp., for LNA; $p<0.05$ and $p<0.05$, resp., for LGH). The results demonstrate that peptidase activities of the intestinal brush border but not of the cytoplasm are increased in experimental diabetes throughout the small intestine in the rat and that the increase is not due to dietary factors.

6739 UREASE AS A CONTRIBUTING FACTOR IN ULCERATIVE LESIONS OF THE COLON. (Eng.)

LeVeen, E. G.; Falk, G.; Ip, M.; Mazzapica, N.; LeVeen, H. H. (State Univ. New York, 450 Clarkson Ave., Brooklyn, NY 11203). *Am. J. Surg.* 135(1):53-56; 1978.

Studies were carried out in dogs to determine whether ammonia is involved in the pathogenesis of colonic ulcerations in uremia. Bilateral nephrectomies or ureteral ligations were performed in 16 dogs, and 8 were immunized with enzymatically inactive urease and tested for the presence of antibodies on an Ouchterlony plate. The serum was also tested chemically to see whether it inhibited the enzymatic conversions of urea to ammonia. Massive hemorrhagic ulcerative colitis was found in six of the eight control dogs that underwent one of the operations, and all died before the sixth postoperative day. All immunized dogs were alive and well 5 days after nephrectomy, and the gastrointestinal tracts were grossly and histologically normal. The mean blood urea nitrogen level for the immunized group was 410 mg/100 ml at the time of sacrifice and 285 mg/100 ml in the nonimmunized animals just prior to death. Portal vein ammonia levels increased in the controls but did not increase significantly in the immunized animals. These results prove that the colonic ulcerations seen in uremia are the result of excessive colonic ammonia production.

6740 DIGESTION OF CERTAIN FRACTIONS OF DIETARY FIBER IN HUMANS. (Eng.)

Holloway, W. D.; Tasman-Jones, C.; Lee, S. P. (Auckland Hosp., Auckland, New Zealand). *Am. J. Clin. Nutr.* 31(6):927-930; 1978.

Studies were carried out to determine if there is cellulose, hemicellulose, or lignin digestion in the human small or large bowel. Six healthy subjects with an ileostomy and 10 normal subjects were studied. Both were put on a fixed diet of known cellulose, hemicellulose, and lignin content. From the feces excreted, the fiber components were measured by the acid and neutral detergent method. From the small bowel, 84.5% of the ingested cellulose was excreted from the ileostomy subjects. From the normal subjects, 22.4% of the ingested cellulose was excreted, indicating that approximately 80% of the cellulose was digested in the large bowel of normal subjects. Of the water insoluble ingested hemicellulose, 27.5% was excreted from the small bowel of the ileostomized patients and 4.0% was excreted by the large bowel of the normal subjects. There is thus approximately 96% digestion of hemicellulose in normal subjects. Lignin was not digested by the small or large bowel. These studies indicate that hemicellulose and cellulose are both digested, mainly in the small intestine in the former case and in the large intestine in the latter case. Hemicelluloses may contribute significantly to the caloric value of foods. Since cellulases are not present in human digestive juices, fiber digestion is probably by intestinal bacteria.

6741 SYNTHESIS OF PLASMALEMMAL GLYCOPROTEINS IN INTESTINAL EPITHELIAL CELLS: SEPARATION OF GOLGI MEMBRANES FROM VILLUS AND CRYPT CELL SURFACE MEMBRANES; GLYCOSYLTRANSFERASE ACTIVITY OF SURFACE MEMBRANE. (Eng.)

Weiser, M. M.; Neumeier, M. M.; Quaroni, A.; Kirsch, K. (Harvard Medical Sch., Boston, MA 02114). *J. Cell Biol.* 77(3):722-734; 1978.

The relationship between Golgi and cell surface membranes of intestinal cells with respect to glycosyltransferase activities was studied. These membranes were isolated from intestinal crypt cells and villus cells. The villus cell membranes consisted of microvillus membrane, a Golgi-rich fraction, and two membrane fractions interpreted as representing lateral-basal membranes. The villus cell microvillus membrane was purified by previously published techniques, while the other membranes were obtained from isolated cells by differential centrifugation and density gradient velocity sedimentation. The two membrane fractions obtained from villus cells and considered to be lateral-basal membranes were enriched for Na^+,K^+-ATPase activity, but one also showed enrichment in glycosyltransferase activity. The Golgi membrane fraction was enriched for glycosyltransferase activity and had low to absent Na^+,K^+-ATPase activity. Adenylate cyclase activity was present in all membrane fractions except the microvillus membrane but copurified with Golgi rather than lateral-basal membranes. Electron microscopy showed that the Golgi fraction consisted of variably sized vesicles and cisternalike structures. The two lateral-basal membrane fractions showed only vesicles of smaller, more uniform size. After ^{125}I labeling of isolated intact cells, radioactivity was found to be associated with the lateral-basal and microvillus membrane fractions and not with the Golgi fraction. Antibody prepared against lateral-basal membrane fractions reacted with the surface membrane of isolated villus cells. The membrane fractions from isolated crypt cells demonstrated that all had high glycosyltransferase activity. The data show that glycosyltransferase activity, in addition to its Golgi location, may be a significant property of the lateral-basal portion of the intestinal villus cell plasma membrane. Data obtained with crypt cells support earlier data and show that the crypt cell surface membrane possesses glycosyltransferase activity.

6742 STUDIES ON TRANSLOCATION OF IMMUNOGLOBULINS ACROSS INTESTINAL EPITHELIUM. III. FAILURE OF CHOLERA ENTEROTOXIN TO STIMULATE SECRETION OF IgA BY RABBIT INTESTINE. (Eng.) Borthistle, B. K.; Isobe, K.; Brown, W. R. (Univ. Oregon Medical Center, 3181 S.W. Sam Jackson Park, Portland, OR 97201). *Am. J. Dig. Dis.* 23(2):134-136; 1978.

To test the hypothesis that secretion of IgA into intestinal fluids is modulated by increases in epithelial cell cyclic AMP (cAMP) levels, purified cholera enterotoxin (10 μg to 1 mg) was instilled into jejunal loops of adult New Zealand white rabbits for 10 min, after which fluid was collected from each loop at hourly intervals for 8 hr. The levels of IgA in these specimens were compared to those in specimens from saline-treated controls by radial immunodiffusion. The fluid collected from 10-μg toxin-stimulated loops was about fivefold that from control loops (10.6 ± 1.0 versus 2.0 ± 0.5 ml/8 hr). At higher toxin doses, there was no increase in fluid response. The total amount of IgA collected from the 10-μg toxin-stimulated loops and from the control loops was similar (21.2 ± 5.1 versus 19.5 ± 3.7 mg/g loop/8 hr) and did not increase at higher toxin doses; hence, the IgA concentration fell in toxin-stimulated loops due to the increase in fluid secretion. The results suggest that the transepithelial transport of IgA into the intestinal lumen is not modulated by cholera-toxin induced increases in intraepithelial cell cAMP, but it is not possible to conclude that intestinal secretion of IgA is never modulated by increases in epithelial cell cAMP.

6743 MICROPROBE MEASUREMENT OF Na, K, AND Cl CONCENTRATION PROFILES IN EPITHELIAL CELLS AND INTERCELLULAR SPACES OF RABBIT ILEUM. (Eng.) Gupta, B. L.; Hall, T. A.; Naftalin, R. J. (Biological Microprobe Lab., Cambridge, England). *Nature* 272(5648):70-73; 1978.

Electron microprobe x-ray analysis of frozen-hydrated sections was used to measure the concentration profiles of Na, K, Cl, Ca, S, and P in the mucosal tissue of rabbit ileum to elucidate how the secretion of Na$^+$ into the lateral intercellular spaces (LIS) generates a flow of water. There was a zone approximately 0.5 μm wide of peripheral cytoplasm immediately adjacent to the cell membrane and including the terminal web area where there was much less S, more P, and much less dry mass (14% of wet mass) than was found in the cell core (25% of wet mass). This zone constitutes 10-20% of cell volume, shows no significant ion gradient, but has a much higher average K concentration than in the cell core. It appears to constitute a compartment with an osmolality intermediate between the bathing medium and the LIS fluid; it may act as a channel in which ions are more mobile and are conducted by an actomyosin system. The cell core, with its high concentration of membraneous organelles, may form a relatively unstirred compartment with slower rates of diffusion. The average concentrations of Na and K in the LIS were significantly higher ($p<0.05$ and $p<0.025$, resp.) than the corresponding concentrations in the bathing solutions and in the capillary fluid. There appeared to be distinct gradients of Na, K, and Cl along the LIS and into the lamina propria, with a plateau about halfway along the channel. The concentration profile in the junctional half of the LIS showed a much steeper gradient within the wider region of the channel ($p<0.025$) than the one across the narrow junctional channel ($p<0.05$). The concentration profiles suggest a considerable osmotic flow of water across the junction into the LIS. The results establish the hypertonicity of the fluid in the LIS and the concentration gradients of Na, K, and Cl in the cells and in the LIS. It is concluded that, during the galactose-induced fluid absorption in rabbit ileum, the LIS form the primary sites of solute-water coupling.

6744 A NEW CORRELATION BETWEEN CALCIUM ABSORPTION AND INTESTINAL ALKALINE PHOSPHATASE ACTIVITY. (Fre.) Fournier, P.; Fontaine, N.; Fournier, A. (Faculte des sciences pharmaceutiques et biologiques, 92290, Chatenay-Malabry, France). *Ann. Nutr. Aliment.* 31(3):277-290; 1977.

A few male rats from an inbred Wistar strain were found to have a spontaneous highly increased ability to absorb calcium when compared to other rats from the same lot. Their calcium absorption coefficients varied from 24 to 47 compared to 13 to 22 for controls. The activity of various alkaline phosphatase preparations derived from ileal mucosa showed a corresponding increase. The activity of other enterocyte brush border enzymes, such as maltase, invertase, and leucylaminopeptidase, was comparable in both exceptional rats and controls. Similarly, there was no difference in alkaline phosphatase activity in other tissues (plasma, liver, kidney, and femur). The elevated calcium absorption and alkaline phosphatase activity were temporary, since exceptional rats bad the same skeletal weight as normals. These findings support the probability that ileal alkaline phosphatases are a factor in calcium transfer in the rat.

6745 IS THE EFFECT OF DIPHENOLIC LAXATIVES MEDIATED VIA RELEASE OF PROSTAGLANDIN E? (Eng.) Beubler, E.; Juan, H. (Institut fur experimentelle und klinische Pharmakologie, Universitats-platz 4, A-8010 Graz, Austria). *Experientia* 34(3): 386-387; 1978.

To investigate whether diphenolic laxatives exert their action via stimulation of prostaglandin (PG) biosynthesis, the diphenolic laxatives bisacodyl and phenolphthalein were compared with the osmotic laxative mannitol in female Sprague-Dawley rats. Net water flux was estimated in the *in vivo* isolated colon using the marker ^{14}C-polyethyleneglycol by measuring the change in its initial concentration over a 60-min period in response to either 4% mannitol, 1 or 10 μg/ml bisacodyl, or 100 μg/ml phenolphthalein. In separate nonisolated colon preparations, a 1-hr perfusion with Tyrode's solution (control period) was followed by a 1-hr perfusion with either 4% mannitol, 50 μg/ml bisacodyl, or 500 μg/ml phenolphthalein, and the PGE concentration in the perfusate was determined by radioimmunoassay. Control net water flux was directed from lumen to blood in the isolated colon; 1 μg/ml bisacodyl reduced this flux significantly ($p<0.05$), and 4% mannitol, 10 μg/ml bisacodyl, and 100 μg/ml phenolphthalein reversed net absorption to net secretion ($p<0.01$). Pretreatment of the rats with indomethacin (4 mg/kg/day, s.c., for 2 days), a PG synthesis inhibitor, did not affect water flux in controls or in mannitol-treated rats, but reduced the effect of 1 μg/ml and 10 μg/ml bisacodyl ($p<0.01$ and $p<0.05$, resp.) and of phenolphthalein ($p<0.01$). Net water flux was in the same direction but 1.74 times higher in the perfused colon than in the tied-off colon, necessitating larger drug doses. Bisacodyl and mannitol significantly reduced net water absorption ($p<0.01$), and phenolphthalein caused net water secretion ($p<0.01$). The amount of PGE released was 250 ± 97 pg/hr during the control period, which amount was significantly increased by bisacodyl (about threefold, $p<0.01$) and by phenolphthalein (about 4.5-fold, $p<0.01$) but was not affected by mannitol. The results suggest that diphenolic laxatives exert their action via stimulation of PGE biosynthesis in the colon.

6746 THE INFLUENCE OF STARVATION ON THE ZINC CONTENT OF PANETH CELLS OF THE RABBIT SMALL INTESTINE.

(Eng.) Singh, I. (Medical Coll., Rohtak, India). *Anat. Anz.* 142(10):502-506; 1977.

Variations in the zinc content of the Paneth cells were examined in the rabbit small intestine during feeding and starvation. No zinc was found in the uodenum of the fed controls and of the animals tarved for 24-72 hr. The zinc content increased n both controls and starved animals in the cranial-audal direction, with the highest amounts found in he terminal ileum. The mean zinc content at each f six levels of small intestine was significantly ower in the starved animals than in the controls p<0.02). These results suggest that zinc is inolved more with the synthesis of the secretory ranules of the Paneth cells, rather than in being constituent thereof.

747 SMALL INTESTINAL MORPHOLOGY AND CELL RENEWAL 72 HOURS AFTER BILE DUCT OPERATION IN RATS.

(Eng.) Ecknauer, R.; Bohmer, R. (Dept. Clinical Chemistry, Univ. Ulm, Ulm, W. Germany). *Digestion* 16(1/2):165-168; 1977.

Small intestinal morphology and epithelial cell renewal were studied in bile duct-fistulated, bile duct-ligated rats, and two different sham-operated control groups, to investigate conflicting reports of the effect of these procedures on turnover of the intestinal epithelium. Sham-operated rats were either kept in restraining cages, as were all the rats with bile duct operation, or in ordinary cages. There was no difference in crypt depth and crypt-villus ratio between the four groups of rats. The rats with bile duct ligation had the shortest villi of the four groups (349 ± 43 and 238 ± 4 μm in jejunum and ileum, resp.). Villus base length showed the same tendency as villus height in the jejunum. Villus base length was shortest in the ileum of the bile duct-fistulated rats (288 ± 21 μm). In the jejunum, villus size of all four groups was smaller than villus size reported in nonstarved rats of the same age and strain, whereas in the ileum there was no significant difference. The number of vincristine-blocked metaphases (VBM) per crypt per 2 hr (representing cell renewal) was lowest in the rats with bile duct fistulation (8.4 ± 6.0 and 5.9 ± 6.0 VBM/2 hr/crypt in jejunum and ileum, resp.) and highest in the nonrestrained sham-operated rats (18.5 ± 3.1 and 20.4 ± 3.7 VBM/2 hr/crypt, resp.). The findings are compatible with the results of a previous investigation in which a reduction in ileal DNA synthesis and in cell shedding occurred following bile duct fistulization.

6748 POSTRESECTIONAL HYPERPLASIA OF THE SMALL INTESTINE WITHOUT BILE AND PANCREATIC JUICE.

(Eng.) Shellito, P. C.; Dahl, E. P.; Terpstra, O. T.; Malt, R. A. (Shriners Burns Inst., Boston, MA 02114). *Proc. Soc. Exp. Biol. Med.* 158 (1):101-104; 1978.

To assess the role of pancreaticobiliary secretions in mediating adaptive hyperplasia of the small intestine, rats with ligation of the pancreaticobiliary duct were studied 48 hr after jejunectomy. After ligation, the rise in ileal RNA content was only 12% as compared with 44% control ($p<0.02$), and the rise in DNA content was only 13% as compared with 25% control ($p<0.01$). The results suggest that some adaptive hyperplasia can occur after pancreaticobiliary ligation, but the hyperplastic response is potentiated by pancreaticobiliary exocrine secretion.

6749 EFFECT OF EXOCRINE PANCREATIC INSUFFICIENCY ON SMALL INTESTINE IN THE MOUSE.

(Eng.) Kwong, W. K. L.; Seetharam, B.; Alpers, D. H. (Washington Univ. Sch. Medicine, 660 S. Euclid, St. Louis, MO 63110). *Gastroenterology* 74(6):1277-1282; 1978.

A genetically conditioned mouse model of exocrine pancreatic insufficiency (epi) was used to study the effect of the absence of lumenal proteases on small intestinal mucosal proteins. The small bowel was divided into eight equal segments. Enzyme activity was increased only in the first three segments in the case of maltase, sucrase, and lactase (all molecular weight >200,000). Alkaline phosphatase (molecular weight 145,000), trehalase (95,000), and peptidase (175,000) activities were unaffected in proximal segments from epi mice. Proximal brush border proteins were identified and measured quantitatively by sodium dodecyl sulfate acrylamide gel electrophoresis. Those enzymes with increased activity were associated with increased amounts of protein in epi mice. Double-label studies of protein turnover revealed a longer half-life for large brush border proteins (molecular weight >175,000) in epi mice than in normal mice. Enterokinase activity (a marker for duodenal mucosa) was nearly absent from the duodenum of epi mice. Receptors for the intrinsic factor-vitamin B_{12} complex (markers for ileal mucosa) were present in the ileum equally in normal and in epi mice. Enterokinase activity can be induced in epi mice by feeding its substrate trypsinogen, but not by trypsin or chymotrypsinogen. Epi mice thus retain the ability to synthesize enterokinase. Pancreatic proteases play an important role in the turnover of certain large mucosal proteins and in the induction of enterokinase.

6750 PROTEIN DIGESTION AND ABSORPTION IN RATS WITH PANCREATIC DUCT OCCLUSION. (Eng.) Curtis, K. J.; Gaines, H. D.; Kim, Y. S. (Veterans Admin. Hosp., 4150 Clement St., San Francisco, CA 94121). *Gastroenterology* 74(6):1271-1276; 1978.

To test the hypothesis that sufficient intraluminal digestion of dietary protein occurs to permit some absorption even in the absence of pancreatic proteolytic enzymes, the effects of pancreatic duct ligation on the digestion and absorption of a randomly ^{14}C-labeled protein meal were investigated in the rat. Although there was a significant reduction in luminal digestion and absorption of the protein meal at 3 and 4 hr in the pancreatic duct-ligated animals compared with controls ($p<0.02$ and $p<0.001$, resp.), 37% of administered protein was absorbed despite absence of luminal pancreatic proteolytic enzyme activity. To characterize further the digestive and absorptive processes that occur in the absence of luminal pancreatic proteolytic enzyme activity, whole protein meal (untreated) and protein preincubated with pepsin and HCl or HCl alone (treated) was instilled into isolated loops of rat intestine containing no demonstrable pancreatic proteolytic enzyme activity. Thirty percent absorption of the untreated protein meal occurred in 4 hr; significantly greater amounts of both treated forms of meal were absorbed ($p<0.005$ with both types of meal). It is concluded that the small bowel has the capacity to hydrolyze and absorb nutritionally significant amounts of dietary large molecular weight protein in the absence of luminal pancreatic enzyme activity. Furthermore, this process may be enhanced by prior denaturation and proteolysis in the stomach.

6751 EFFECTS OF HIGH PROTEIN DIET ON ADAPTATIONAL PROCESSES FOLLOWING SMALL INTESTINAL BY-PASS IN THE RAT. (Eng.) Macarone-Palmieri, R.; Mirkovitch, V.; Robinson, J. W. L.; Saegesser, F. (Centre Hospitalier Universitaire Vaudois, 1011 Lausanne, Switzerland). *Gastroenterol. Clin. Biol.* 2(3):279-286; 1978.

The effect of a high-protein diet on intestinal adaptation to an intestinal bypass was studied in male Wistar rats. In these animals, 70% of midintestine was excluded and drained through an end-to-side ileocecal anastomosis, while continuity was re-established between the jejunal and ileal remnants. During the 3 postoperative weeks, one group was fed with standard pellet food and the other with one of threefold greater protein content with the same daily caloric intake. The high-protein diet significantly reduced the postoperative weight gain ($F_{1,22}=4.55$). Both the jejunum and ileum in continuity in the animals on a high-protein diet retained the same rate of absorption of water, sodium, and glucose *in vivo* as that of control rats; their mucosae had normal sucrase content (1.0 ± 0.21, 0.4 ± 0.08, and 1.0 ± 0.20 IU/g in jejunum, ileum, and excluded loop, resp.), but lower phenylalanine uptake *in vitro* ($p<0.001$) and an increase in villus height in the jejunum ($p<0.005$) as compared to pellet-fed controls. The animals fed standard pellets manifested a greater jejunal water absorption, a higher mucosal sucrase content, but a less pronounced increase in villus height compared with the high-protein diet group. In the excluded intestines, which remained without intraluminal nutrition, there was no functional or morphological atrophy. The results suggest that the high-protein diet, as compared with the standard diet, was more effective in inducing an increase in the absorptive surface of the intestine in continuity during the adaptive process. Conversely, the high-protein diet resulted in an apparently greater reduction in intestinal absorption *in vivo*.

6752 EXPERIMENTAL STUDIES ON FLUID PATHOPHYSIOLOGY IN SMALL INTESTINAL OBSTRUCTION IN THE RAT: IV. EFFECTS OF INTRALUMINAL HYPEROSMOLALITY AND SIMULTANEOUS INTRAVENOUS INFUSIONS ON MUCOSAL MICROMORPHOLOGY. (Eng.) Johnson, L.; Lundquist, P. G.; Nordstrom, H.; Nylander, G. (Karolinska Hosp., 104 01 Stockholm 60, Sweden). *Scand. J. Gastroenterol.* 13(3):373-384; 1978.

6753 FLAVIN PHOSPHATASE ACTIVITY OF INTESTINAL BRUSH BORDER: FUNCTION IN INTESTINAL ABSORPTION OF DIETARY RIBOFLAVIN [Abstract]. (Eng.) Akiyama, T.; Selhub, J.; Rosenberg, I. H. (Dept. Medicine, Univ. Chicago, Chicago, IL). *Am. J. Clin. Nutr.* 31(4):695; 1978.

6754 STIMULATION OF HUMAN COLONIC ADENYLATE CYCLASE [Letter to Editor]. (Eng.) Simon, B.; Kather, H. (Universitats-Klinik, Bergheimerstrasse 58, 69 Heidelberg, W. Germany). *Am. J. Dig. Dis.* 23(1):93-94; 1978.

'55 PATHOPHYSIOLOGICAL ASPECTS OF COXSACKIE-VIRUS B INTESTINAL INFECTION. (Eng.)
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'56 RE-EXAMINATION OF SMALL INTESTINAL DISPOSAL OF Vibrio cholerae IN MICE. (Eng.) Bloom,
; Rowley, D. (Dept. Microbiology and Immunology,
iv. Adelaide, Adelaide, South Australia 5000,
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:385-391; 1977.

'57 DEVICE FOR OBTAINING MULTIPLE SIMULTANEOUS SAMPLES OF INTESTINAL CONTENTS DURING PER-
SION STUDIES IN MAN. (Eng.) Matseshe, J. W.;
lagelada, J. R.; Phillips, S. F. (Mayo Clinic and
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6758 SPECIFIC BINDING OF ^{3}H-MEPYRAMINE TO HISTAMINE H_1 RECEPTORS IN INTESTINAL SMOOTH MUSCLE. (Eng.) Hill, S. J.; Young, J. M.; Marrian, D. H. (Dept. Pharmacology, Univ. Cambridge, Hills Rd., Cambridge, England). *Nature* 270(5635): 361-363; 1977.

See also, 6571, 6577, 6584, 6605, 6606, 6607, 6617, 6627, 6649, 6672, 6684, 6733, 6760, 6764, 6786, 7023, 7092.

GENERAL

59 THE DISTRIBUTION OF BLOOD FLOW ALONG THE SMALL INTESTINE OF THE DOG. (Eng.) Eade,
N.; Ginn, R. W. (Sch. Medicine, Auckland Univ.,
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7(3):390-392; 1978.

investigate whether a blood flow gradient exists
ong the small intestine of the dog, intestinal
ood flow was measured by the indicator-frac-
onation technique with ^{42}K (15 µCi/kg) as the
dicator in 18 anesthetized mongrel dogs. A two-
y analysis of variance demonstrated a signifi-
nt difference of blood flow in the duodenal, je-
nal, and distal ileal sites ($p<0.01$), and Scheffe
ltiple comparison tests showed that the mean
ood flow in the distal ileum was significantly
wer than in the duodenum ($p<0.05$) or in the je-
num ($p<0.05$). There was no significant differ-
ce in blood flow between the duodenum and je-
num. In eight studies in which jejuno-ileal blood
ow was measured, it was significantly higher than
flow in the distal ileum ($p<0.01$) and somewhat
wer than the flow in the duodenum or jejunum. The
n intestinal blood flow to all sites was signi-
antly higher ($p<0.05$) in animals with cardiac
put >10 ml/min/100 g (i.e., in the 7 dogs with-
laparotomy). The results indicate that, when
estinal blood flow is measured under basal con-
ions in the dog, there is a definite gradient
blood flow down the intestine.

0 MICROLYMPHANGIOGRAPHIC STUDY OF LYMPHATIC REGENERATION FOLLOWING INTESTINAL ANAS-
OSIS. (Eng.) Satomura, K.; Tanigawa, N.; Magari, S. (Sch. Medicine, Kyoto Univ., Kyoto, Japan). *Surg. Gynecol. Obstet.* 146(3):415-418; 1978.

Lymphatic regeneration of the canine intestinal lymphatic system was studied following a single-layer inverting ileal anastomosis using a microlymphangiographic technique in which differentiation between lymphatic and blood vessels was assured by washing out the intravascular dye with a saline perfusion solution. Specimens were prepared for light microscopic examination. The central lymphatics in the mucosa of the ileum were readily identified at the center of villi, there was a horizontal lymphatic network at the bottom of the villi, and some branches of it entered the muscularis mucosa, forming a second horizontal network that spread to the bottom of the intestinal glands. Branches of this plexus entered into the submucosa, where the lymphatic vessels were characterized by their large diameters and were associated in a loose plexus with paired arteries and veins, the three vessels running along together. These lymphatics entered the subserosa and received additional branches from a dense tangential plexus located between the circular and longitudinal muscle layers. On the fourth postoperative day, the lymphatics were still interrupted close to the anastomotic line. On the seventh postoperative day, cross circulation of the lymphatics was recognized, and the transverse lymphatics were dilated and apparent; these findings persisted on days 10 and 14. On the 21st day, the normal lymphatic vessel pattern was restored: fine, relatively straight vessels appeared across the anastomotic line.

6761 THE SIGNIFICANCE OF ELEVATED PERITONEAL FLUID PHOSPHATE LEVEL IN INTESTINAL INFARCTION. (Eng.) Sawer, B. A.; Jamieson, W. G.; Durand, D. (Victoria Hosp., London, Ontario, Canada). *Surg. Gynecol. Obstet.* 146(1):43-45; 1978.

A previously described model of intestinal infarction was used to duplicate the original experiment, which demonstrated a significant rise in the serum inorganic phosphate level, and to study the composition of peritoneal fluid. The superior mesenteric artery was doubly ligated at its origin in 10 dogs, and the superior mesenteric vein was tied as it joins the portal vein in another 10. Controls underwent laparotomy with dissection of the superior mesenteric artery or vein. There was a significant increase in the inorganic phosphate level in the peritoneal fluid in all experimental dogs ($p<0.05$), by 2 hr postligation in the superior mesenteric vein-ligated group and by 4 hr in the superior mesenteric artery-ligated group. At 2 hr, the mean levels in the artery- and vein-ligated groups were 6.0 ± 0.56 mg% and 8.1 ± 0.71 mg%, resp. ($p<0.05$). This difference was also seen at 4 hr. Significantly higher ($p<0.05$) serum levels of inorganic phosphate and base deficit were also seen in the experimental groups. These results confirm those of the previous study and show that the inorganic phosphate level in the peritoneal fluid is elevated in addition to that in the serum. The authors suggest that, in the patient with possible intestinal infarction, an elevated serum phosphate level, elevated peritoneal fluid phosphate level, greater base deficit, and leukocytosis may be useful in making an earlier diagnosis of this disease, thereby reducing its morbidity and mortality.

6762 COMPARISON OF RADIO-OPAQUE PELLETS AND CHROMIUM SESQUIOXIDE AS INERT MARKERS IN STUDIES REQUIRING ACCURATE FAECAL COLLECTIONS. (Eng.) Branch, W. J.; Cummings, J. H. (MRC Dunn Nutrition Unit, Cambridge, England). *Gut* 19(5):371-376; 1978.

Radiopaque pellets (ROP) similar to those currently used to measure gastrointestinal transit time were compared with chromium sesquioxide to assess their suitability for use as inert markers in the gut. Five healthy subjects took both markers with every meal for two separate 3-week periods while taking metabolically controlled diets. Overall recovery of both markers was satisfactory; ROP was 99.7 ± 0.3% recovered and chromium, 97.8 ± 1.6%. A comparison of the amount of each marker recovered in 69 separate fecal collection periods of various lengths showed close agreement ($r=0.99$), and the tail-off in marker excretion after cessation of ROP and chromium intake was similar, although slightly more prolonged for chromium. The amount of marker retained in the gut was 13.5% greater for chromium at the end of the 3-week study periods. Both markers proved to be satisfactory for correcting variations in fecal calcium output. The ROP, however, offer clear advantages over chromium in that they are considerably easier and quicker to measure, the method of measurement using x-rays does not alter the stools, and fecal handling is minimized. The precision of ROP measurement is greater and, because of the variety of ROP available, they offer more flexibility for metabolic studies. In addition, stool by stool analysis is possible, enabling simultaneous measurement of mean transit time to be made in experimental subjects.

6763 THE DISINTEGRATION OF SURGICAL SUTURES ON EXPOSURE TO PANCREATIC JUICE. (Eng.) Mizuma, K.; Lee, P. C.; Howard, J. M. (Medical Coll. Ohio at Toledo, P.O. Box 6190, Toledo, OH 43614). *Ann. Surg.* 186(6):718-722; 1977.

6764 DIFFERENTIATION OF INTRAMURAL GANGLIA IN THE DISSOCIATED RECTOSIGMOID OF THE RAT: AN ORGAN CULTURE STUDY. (Eng.) Ito, Y.; Donahoe, P. K.; Hendren, W. H. (Massachusetts General Hosp., 32 Fruit St., Boston, MA 02114). *J. Pediatr. Surg.* 12(6):969-975; 1977.

6765 EFFECT OF ANTACIDS ON ASPIRIN DISSOLUTION AND BIOAVAILABILITY. (Eng.) Nayak, R. K.; Smyth, R. D.; Polk, A.; Herczeg, T.; Carter, V.; Visalli, A. J.; Reavey-Cantwell, N. H. (McNeil Lab., Inc., Camp Hill Rd., Fort Washington, PA 19034). *J. Pharmacokinet. Biopharm.* 5(6):597-613; 1977.

6766 CYANOACRYLATE SEALING OF PANCREATIC BIOPSY SITES IN DOGS. (Eng.) Harmon, H. C.; Doan, T. B.; Pate, J. W. (Univ. Tennessee Center Health Sciences, Memphis, TN 38103). *Am. Surg.* 43(12):807-810; 1977.

6767 PURIFICATION AND PARTIAL CHARACTERIZATION OF THE GASTRIC ULCER INHIBITORY SUBSTANCE FROM CULTURE FILTRATE OF Bacillus subtilis H. (Eng.) Mimura, T.; Muto, N.; Tsujibo, H.; Onishi, N.; Aonuma, S. (Faculty Pharmaceutical Sciences, Osaka Univ., 133-1, Yamadakami, Suita-shi, Osaka, Japan). *Chem. Pharm. Bull.* 25(10):2770-2774; 1977.

6768 THE PHARMACOLOGY OF SC-27166: A NOVEL ANTIDIARRHEAL AGENT. (Eng.) Dajani, E. Z.; Bianchi, R. G.; East, P. F.; Bloss, J. L.; Adelstein, G. W.; Yen, C. H. (Searle Lab., P.O. Box 5110, Chicago, IL 60680). *J. Pharmacol. Exp. Ther.* 203(3):512-526; 1977.

6769 ANTIDIARRHEAL AND CENTRAL NERVOUS SYSTEM ACTIVITIES OF SC-27166 (2-[3-(5-METHYL-1 3,4-OXADIAZOL-2-YL)-3,3-DIPHENYLPROPYL]-2-AZA-

BICYCLO[2.2.2]OCTANE), A NEW ANTIDIARRHEAL AGENT, RESULTING FROM BINDING TO OPIATE RECEPTOR SITES OF BRAIN AND MYENTERIC PLEXUS. (Eng.) Mackerer, C. R.; Brougham, L. R.; East, P. F.; Bloss, J. L.; Dajani, E. Z.; Clay, G. A. (Searle Lab., P.O. Box 5110, Chicago, IL 60680). *J. Pharmacol. Exp. Ther.* 203(3):527-538; 1977.

See also, 6647, 6651, 6660, 6670, 6712, 6725, 7108, 7211.

DIAGNOSTIC PROCEDURES

6770 ULTRASONIC FINDINGS IN INTRAMURAL EXOGASTRIC LESIONS. (Eng.) Sandler, M. A.; Ratanaprakarn, S.; Madrazo, B. L. (Henry Ford Hosp., 2799 West Grand Blvd., Detroit, MI 48202). *Radiology* 128(1):189-192; 1978.

The cases of four patients with intramural exogastric masses in whom ultrasonic findings suggested a gastric origin are presented. In all cases, a large mass was identified in the left mid- and upper abdomen with a strip of solid tissue extending toward the left hemidiaphragm anteriorly, adjacent to the left lobe of the liver. This finding, best demonstrated on longitudinal scanning, suggested that the mass originated in the stomach, rather than in the spleen or splenic flexure of the colon, which are posterior in location. Two lesions were leiomyoblastomas and two leiomyosarcomas. A benign leiomyoblastoma in one patient contained a small number of echoes of low intensity, while a malignant leiomyoblastoma contained a very large number of high-intensity echoes. This difference could have been due to the necrosis in the malignant lesion providing numerous interfaces between tissues with substantially different acoustic impedance properties, in contrast with the cellular uniformity of the benign lesion. The ultrasound examination in both patients with leiomyosarcoma demonstrated a solid mass with many high-amplitude echoes similar in appearance to the malignant leiomyoblastoma. In the patient with the malignant leiomyoblastoma, the gastric origin of the mass was not considered until the ultrasound examination was carried out. This examination may suggest that a lesion is of gastric origin, and the patient's evaluation may be expedited.

6771 BARIUM ENEMA: AN OUTPATIENT PROCEDURE IN THE EARLY DIAGNOSIS OF ACUTE APPENDICITIS. (Eng.) Lewin, G. A.; Mikity, V.; Wingert, W. A. (Univ. Southern California Sch. Medicine, 1129 North State St., Rm. 1D36A, Los Angeles, CA 90033). *J. Pediatr.* 92(3):451-453; 1978.

The diagnostic value of barium enema as an outpatient procedure was evaluated in 50 children (ages 1-18 yr) to improve the early detection of appendicitis and to reduce both unnecessary resection and morbidity due to perforation. The procedure was performed on an emergency basis without bowel preparation when routine history, physical findings, laboratory data, and roentgenograms were equivocal. Fluoroscopic control and gravity technique not exceeding a height of 90 cm were used; spot films and pre- and postevacuation films were taken, and a specific effort was made to fill the appendix by changing the patient's position. The criteria of Soter and Schey were used for diagnosis. Of 49 successful barium enemas, 36 were normal, 12 were positive, and there was 1 nonfilling appendix. Follow-up was done on 30 normal patients and the 1 with nonfilling appendix, and no sequelae were observed; 6 girls with normal findings were treated for pelvic inflammatory disease (5) or ovarian cyst (1). The positive studies expedited definitive therapy, and were 100% selective for disease requiring surgery; no morbidity from unnecessary surgery occurred. The procedure is recommended particularly in preschool-age children, the obese, the teenage girl with right lower quadrant pain, and in children with chronic diseases in whom an early correct diagnosis is extremely important.

6772 NEW TECHNIQUE OF EXOCRINE PANCREATIC FUNCTION TESTING WITH THE USE OF 4-(N-ACETYL-L-TYROSYL)AMINOBENZOIC ACID. (Cze.) Malis, F.; Fric, P.; Kasafirek, E.; Slaby, J. (II. vedecke oddeleni gastroenterologicke fakulty vseobecneho lekarstvi, Universita Karlova, Karlovo nam. 32, 121 11 Praha 2, Czechoslovakia). *Cas. Lek. Cesk.* 116 (48):1489-1493; 1977.

A 2-g oral dose of 4-(acetyl-L-tyrosyl)aminobenzoic acid was used to assay pancreatic chymotrypsin secretion following stimulation by Lundh's test meal in 45 subjects, including normal controls. Under the action of chymotrypsin, 4-aminobenzoic acid is released in the intestine, and its urinary excretion indicates the degree of exocrine pancreatic secretion. The urinary 4-aminobenzoic acid level is determined by the diazo reaction following acid hydrolysis. The average 4-aminobenzoic acid level found in 8-hr urine samples of healthy controls was 69.4 ± 3% with the lower standard limit of 49.6%. The average 4-aminobenzoic acid level was markedly lower in patients with pancreatic insufficiency (25.1 ± 3.6%). Reduction of the urine collection period to 6 hr was permissible for patients with advanced pancreatic insufficiency. Patients with sprue require an 8-hr urine collection period. The new test is also suitable for outpatient screening.

6773 RADIOIMMUNOASSAY OF LACTOFERRIN IN PANCREATIC JUICE AS A TEST FOR PANCREATIC DISEASES. (Eng.) Fedail, S. S.; Harvey, R. F.; Salmon P. R.; Read, A. E. (Bristol Royal Infirmary, Bristol England). *Lancet* 1(8067):181-182; 1978.

A radioimmunoassay for lactoferrin (LF) was developed to assess the possibility that the measurement of LF in pancreatic juice obtained endoscopically might be helpful in the diagnosis of pancreatic diseases. Pancreatic juice was obtained from 19 patients with chronic pancreatitis and 10 with cancer of the pancreas and from 11 controls. Median LF concentrations were 2,310 ng/ml (range 870-11,400 in patients with chronic pancreatitis compared with 128 ng/ml (range 30-390) in controls and 105 ng/ml (range 10-387) in patients with pancreatic cancer. In one patient with both cancer and pre-existing pancreatitis (for 16 yr), the LF concentration was high (1,300 ng/ml). The results suggest that measurement of lactoferrin in pure pancreatic juice may be useful in the diagnosis of pancreatic disease, especially in the differential diagnosis between cancer and pancreatitis.

6774 ANGIOGRAPHY OF THE PANCREAS. (Eng.) Ekelund, L.; Gerlock, J. (Vanderbilt Univ. Hosp., Nashville, TN 37232). *South. Med. J.* 71(2):173-176; 1978.

The diagnostic potentials of pancreatic angiography are discussed on the basis of four illustrative cases and a review of the literature. The approach must be adjusted to each individual patient, and the examination must proceed until malignancy is confirmed or eliminated. Both the celiac and superior mesenteric arteries must be examined, superselective catheterization of the gastroduodenal or dorsal pancreatic artery should always be attempted, and pharmacoangiography is sometimes helpful in enhancing visualization of the small pancreatic vessels. A normal pancreaticogram in a 40-yr-old man is presented. Pancreaticography revealed discrete, serpiginous encasement of small arteries in the head of the pancreas in a 56-yr-old man; percutaneous transhepatic cholangiography demonstrated obstruction of the common bile duct at this level, and at operation a resectable 2 x 2 cm carcinoma was found. In a 60-yr-old man, angiography indicated a mass in the body and tail of the pancreas, occlusion of the splenic vein with collateral formation, and obstruction at the junction of the superior mesenteric and portal veins. The diagnosis of large, nonresectable carcinoma was confirmed at operation. In a 30-yr-old woman, angiography failed to reveal tumor vessels, and all veins were seen to be normal. A possible expansile lesion in the head of the pancreas was suggested and at operation, a small inflammatory mass was found. Irregular encasement of arteries is the most reliable angiographic finding in the diagnosis of pancreatic carcinoma, the incidence of tumor vessels in these lesions is a debated subject, and the demonstration of venous lesions is very important in the diagnosis.

6775 THE EFFECT OF GASTROGRAFIN AND GLUCAGON ON CT SCANNING OF THE PANCREAS: A BLIND CLINICAL TRIAL. (Eng.) Moss, A. A.; Kressel, H. Y.; Korobkin, M.; Goldberg, H. I.; Rohlfing, B. M.; Brasch, R. C. (Univ. California Sch. Medicine, San Francisco, CA). *Radiology* 126(3):711-714; 1978.

To overcome certain problems that reduce the information content of computed tomographic (CT) scans of the abdomen, a blind clinical trial of the effects of Gastrografin and glucagon on pancreatic CT scanning was carried out in 25 patients who had not had gastric surgery. Following an initial scan, the patients were given dilute Gastrografin (10 ml/230 ml water) to drink and placed on their right sides for 5 min. After being repositioned for scanning in the supine position, glucagon (1 mg over 1 min, i.v.) was given to each patient. The pancreatic region was then rescanned. The series of scans were randomly coded and rated by four radiologists skilled in CT interpretation. Rating for overall pancreatic visualization, visualization of the pancreatic head, body, and tail, and the presence of gas artifacts was performed on a scale of 0 to 4, and the data were statistically analyzed. A significant improvement in visualization of all parts of the pancreas and a reduction in gas artifacts were found following Gastrografin and glucagon administration ($p<0.005-0.02$ for the pooled ratings of the 4 raters). There was a high level of correlation ($r=0.56-0.76$) among the independent ratings performed. Gastrografin-glucagon administration is recommended prior to pancreatic CT scanning if the scanning cycle is 18 sec or longer.

6776 ENDOSCOPY-RELATED BACTEREMIA. (Eng.) Stray, N.; Midtvedt, T.; Valnes, K.; Rosseland, A.; Pytte, R.; Hovik, B. (Central Hosp. Akershus, Oslo, Norway). *Scand. J. Gastroenterol.* 13(3):345-347; 1978.

To determine the risk of bacteremia in patients undergoing endoscopic retrograde cholangiopancreatography (ERCP), a prospective study of 100 patients undergoing gastroscopy, 25 undergoing colonoscopy, and 25 undergoing ERCP was undertaken. The patients were unselected except that none had received antibiotics for 4 days before the procedure, none was febrile, and none had i.v. or urinary bladder catheters. Blood sampling was performed from an antebrachial vein. Bacteremia was detected in 1/100, 1/25, and 0/25 patients subjected to gastroscopy, coloscopy, and ERCP, resp. In 4/600 blood cultures performed, the bacilli recovered appeared to be due to contamination. The results suggest that bacteremia is very rare after endoscopy of the gastrointestinal tract. Therefore, routine prophylactic antimicrobials are not advocated for patients undergoing endoscopic procedures.

6777 USE OF ERCP IN THE DIAGNOSIS OF INTERNAL PANCREATIC FISTULA. (Eng.) Sottomayor, M.; Nom Chong, R.; Dawson, M. (Baragwanath Hosp., P.O. Bertsham, Johannesburg, South Africa). *Gut* 19(3):244-246; 1978.

Two cases of pancreatic ascites in which internal pancreatic fistulae were demonstrated preoperatively using endoscopic retrograde pancreatography (ERCP) are described. The patients, a 31-yr-old man and a 42-yr-old woman, presented with abdominal distention and weight loss. Both had a history of heavy alcohol consumption. Despite paracentesis, ascites accumulated rapidly. ERCP showed features of chronic pancreatitis in both patients and a leak of contrast media from the pancreatic tail into the ascitic fluid in the first patient and from a ruptured pseudocyst into the lesser sac in the second. ERCP is an effective diagnostic technique and may be useful in planning the best method of treatment.

6778 COMPUTED TOMOGRAPHIC SCANNING IN LIVER DISEASE. (Eng.) Fawcitt, R. A.; Forbes, W. C.; Isherwood, I.; Morris, A. I.; Marsh, M. N.; Turnberg, L. A. (Dept. Diagnostic Radiology, Univ.

Manchester, M13 9PT, England). *Clin. Radiol.* 29(3): 251-254; 1978.

The value of computed tomography (CT) in the diagnosis of liver diseases was assessed in 100 patients with liver diseases (23 with jaundice, 40 with cirrhosis, 7 with fatty infiltration, 10 with malignancy, 15 with acute and chronic active hepatitis, and 17 with miscellaneous liver diseases). Of the 23 jaundiced patients, 14 had extrahepatic biliary obstruction, in 13 of which a dilated duct system was demonstrated. The cause of the obstruction was demonstrated by CT in 11 cases. In the nine cases of intrahepatic jaundice, a normal duct system was reported in eight. Reduced liver volume was observed by CT in 14 of 33 cases of nonhemochromatotic cirrhosis and in 4 of 7 cases of cirrhosis with hemochromatosis. CT was diagnostic of fatty infiltration in five of the seven cases. Hepatic metastases were correctly interpreted in six of eight patients, where they were seen as localized areas of diminished density. Eleven patients with chronic active hepatitis were examined, and in the six without marked cirrhotic change, nonspecific abnormalities such as hepatomegaly or hepatosplenomegaly were found. Two of four patients with acute hepatitis had normal scans, and the other two showed hepatic or splenic enlargement. The results show that CT is valuable in the diagnosis of hepatic and biliary tract diseases. Further refinement of hepatic density analysis promises to increase the diagnostic value of CT in cirrhosis.

6779 DIAGNOSTIC ACCURACY OF CT IN CIRCUMSCRIPT LIVER DISEASE.

(Eng.) Scherer, U.; Rothe, R.; Eisenberg, J.; Schildberg, F. W.; Meister, P.; Lissner, J. (Universitat Munchen Klinikum Grosshadern, Marchioninistrasse 15, 8000 Munchen 70, W. Germany). *Am. J. Roentgenol.* 130(4):711-714; 1978.

To evaluate the accuracy of computed tomography (CT) in diagnosing circumscript liver disease, CT findings in 105 patients, usually referred for presumed liver disease but sometimes for suspected pancreatic disease, suspected retroperitoneal lymphomas, or known circumscript liver disease, were compared with the results of invasive diagnostic procedures (51 laparoscopies, 46 laparotomies, and 20 autopsies with at least one procedure performed in each patient). The mean and maximum intervals between the CT scans and invasive procedures were 12.5 and 73 days, resp. All scans were read twice: at the time of the study and retrospectively without knowledge of the results of the invasive procedures, and the data are based on the retrospective evaluation. The invasive methods demonstrated circumscript liver disease in 45/105 patients. In cases of adenoma (1), simple cysts (2), polycystic disease (3), abscesses (2), and echinococciasis (1), the CT diagnosis was correct. In the one case of eosinophilic infiltrations and the one of cholangioma, CT disclosed multiple small areas of decreased density, but a type-specific diagnosis could not be made. In 28/31 cases of metastatic liver disease, the CT diagnosis was correct; 3 cases were misinterpreted as normal. Two of three cases of carcinoma were accurately diagnosed by CT, and one was misinterpreted as hepatosplenomegaly. One case of hemangioma was misinterpreted as normal. There were 6 false-positive diagnoses among the 60 patients without circumscript liver disease: 4 diagnoses of suspicion of metastatic liver disease, 1 misinterpretation of a basal pleural effusion as a large intrahepatic cyst, and 1 diagnosis of a small intrahepatic cyst that did not reach the surface of the liver (although classified as a false-positive, it might be accurate, as laparoscopy only, and not biopsy, was performed). CT is valuable in detecting and differentiating circumscript liver disease. The diagnostic accuracy of CT in diffuse liver disease remains to be established.

6780 DETECTION OF HEPATITIS-B SURFACE ANTIGEN IN BLOOD AND BLOOD PRODUCTS DRIED ON FILTER PAPER.

(Eng.) Farzadegan, H.; Noori, K. H.; Ala, F. (Iranian Natl. Blood Transfusion Service, 138 Villa Ave., Teheran, Iran). *Lancet* 1(8060): 362-363; 1978.

A method for the detection of hepatitis B surface antigen (HBsAg) in blood and blood products dried on filter paper was developed. One drop (>0.025 ml) of capillary whole blood was collected on Whatman 4 filter discs from 10 healthy carriers of HBsAg, and blood obtained by venepuncture from the subjects was processed to obtain packed RBC, plasma, WBC, and platelets. A drop of each of these products and a known HBsAg-positive plasma Cohn fraction-II sample were also put on filter discs. Replicate samples were stored in polyethylene tubes for 1, 3, 7, 14, or 30 days at 4 C or 37 C to simulate various conditions of field study. Then 1, 5, or 10 ml of 0.85% saline solution was added to each tube for 30 min, and the solution was analyzed for HBsAg by immunoelectro-osmophoresis (IEOP), hemagglutination inhibition (HAI), reverse passive hemagglutination (RPHA), and radioimmunoassay (RIA). RIA detected HBsAg in every sample. RPHA was positive in all 1-day samples, in 11/14 7-day samples, and in 7/14 30-day samples. HAI and IEOP were less sensitive, in that order. Dilutions with 1 ml of saline gave the most strongly positive results; 4 C was the best storage temperature. The results suggest that the filter paper technique would have logistic and economic advantages in hepatitis B surveillance programs and would not be associated with a loss of sensitivity or specificity when analyzed by RIA or RPHA.

6781 DOSE RESPONSE TO INTRAMUSCULAR GLUCAGON DURING HYPOTONIC RADIOGRAPHY.

(Eng.) Miller, R. E.; Chernish, S. M.; Brunelle, R. L.; Rosenak, B. D. (Indiana Univ. Sch. Medicine, Indianapolis, IN 46202). *Radiology* 127(1):49-53; 1978.

6782 IOGLYCAMIDE (BILIGRAM) STUDIES IN MAN. RADIOLOGICAL OPACIFICATION OF THE BILE

DUCT. A COMPARISON OF A NUMBER OF DIFFERENT METHODS. (Eng.) Bell, G. D.; Frank, J.; Fayadh, M.; Smith, P. L. C.; Fry, I. K. (City Hosp., Hucknall Rd., Nottingham, England). *Br. J. Radiol.* 51(603):191-195; 1978.

6783 THE STATE OF RADIOGRAPHIC TECHNIQUE IN THE EXAMINATION OF THE COLON: A SURVEY. (Eng.) Thoeni, R. F.; Margulis, A. R. (Univ. California Sch. Medicine, San Francisco, CA 94143). *Radiology* 127(2):317-323; 1978.

6784 LOCALIZATION OF THE HEAD OF THE PANCREAS USING THE JUNCTION OF THE LEFT RENAL VEIN AND THE INFERIOR VENA CAVA. (Eng.) Kuhns, L. R.; Borlaza, G. S.; Seigel, R.; Cho, K. J. (Univ. Michigan Medical Center, Ann Arbor, MI). *J. Comput. Assisted Tomogr.* 2(2):170-172; 1978.

6785 FUNDAMENTAL AND CLINICAL STUDIES ON AMYLASE ISOZYMES. (Eng.) Takeuchi, T.; Kameya, T.; Sugimura, T. *In: Pathophysiology of Carcinogenesis in Digestive Organs. Proceedings of the 7th International Symposium of The Princess Takamatsu Cancer Research Fund, Tokyo, 1976.* (Tokyo: University of Tokyo Press): pp. 351-362; 1977.

6786 EFFECTS OF ORALLY FED CHOLERA TOXIN IN ADULT RATS. (Eng.) Akhter, M. H.; Sabir, M.; Bhide, N. K. (All India Inst. Medical Sciences, New Delhi 110016, India). *Indian J. Exp. Biol.* 15(10):891-894; 1977.

6787 A "NEW" DIAPHRAGM FOLLOWING PROSTHETIC REPAIR OF EXPERIMENTAL HEMIDIAPHRAGMATIC DEFECTS IN THE PUP. (Eng.) Touloukian, R. J. (Yale Univ. Sch. Medicine, New Haven, CT). *Ann. Surg.* 187(1):47-51; 1978.

6788 ESTIMATION OF THE SODIUM CONTENT AND NEUTALISING CAPACITY OF SOME COMMONLY USED ANTACIDS [Abstract]. (Eng.) Barry, R. E.; Ford, J. (Dept. Medicine, Univ. Bristol, Bristol, England). *Gut* 18(11):A969; 1977.

6789 EFFECT OF ACID AND PEPSIN ON BLOOD COAGULATION AND PLATELET AGGREGATION: A POSSIBLE CONTRIBUTOR TO PROLONGED GASTRODUODENAL MUCOSAL HEMORRHAGE. (Eng.) Green, F. W., Jr.; Kaplan, M. M.; Curtis, L. E.; Levine, P. H. (Memorial Hosp., 119 Belmont St., Worcester, MA 01605). *Gastroenterology* 74(1):38-43; 1978.

6790 UPPER GASTROINTESTINAL FIBERENDOSCOPY IN CHILDREN. (Por.) de Oliveira Lemos, A. T.; Polonovski, J. C.; Mougenot, J. F. (Av. Almirante Alexandrino, 720, ap. 203, 3000 Belo Horizonte, MG., Brasil). *Arq. Gastroenterol.* 14(4):236-240; 1977.

6791 RESULTS OF THERAPY OF GASTRO-INTESTINAL HEMORRHAGE BEFORE AND AFTER INTRODUCTION OF EMERGENCY ENDOSCOPY AT THE BONN UNIV. SURGICAL CLINIC [Abstract]. (Eng.) Oberhammer, E.; Paquet, K. J. (Surgical Clinic, Univ. Bonn, Bonn, W. Germany). *Endoscopy* 9(3):189-190; 1977.

6792 REPORT ON PRELIMINARY EXPERIMENTAL AND CLINICAL EXPERIENCES WITH A NEW TYPE OF ENDOSCOPIC ARGON LASER PHOTOCOAGULATOR [Abstract]. (Eng.) Fruhmorgen, P.; Reidenbach, H. D.; Bodem, F.; Kaduk, B.; Demling, L. (Medical Dept., Univ. Erlangen-Nurnberg, D-8520 Erlangen, W. Germany). *Endoscopy* 9(3):191; 1977.

6793 PROXIMAL INTESTINOSCOPY: PREMEDICATION WITH DIMENHYDRINATE AND PETHIDINE--A DOUBLE-BLIND STUDY [Abstract]. (Eng.) Pohle, W.; Hofmann, E.; May, B.; Muller, H. O.; Salamon, V. (Med. Klinik und Poliklinik "Bergmannsheil," Hunscheidtstr. 1, 4630 Bochum 1, W. Germany). *Endoscopy* 9(3):191; 1977.

6794 IMPROVED RADIONUCLIDE IMAGING OF THE PANCREAS [Letter to Editor]. (Eng.) Nathan, M. H.; Domanski, K. (Scottsdale Memorial Hosp., Scottsdale, AZ). *JAMA* 239(9):831-833; 1978.

6795 THIOCYANATE AS A MARKER OF SALIVA IN GASTRIC JUICE [Abstract]? (Eng.) Boulos, P. B.; Dave, M.; Whitfield, P. F.; Hobsley, M. (Middlesex Hosp., London, England). *Br. J. Gastroenterol.* 18(11):A946-A947; 1977.

6796 BREATH TESTS IN GASTROENTEROLOGY. (Eng.) Hepner, G. W. (Univ. California Sch. Medicine, Torrance, CA). *Adv. Intern. Med.* 23:25-45; 1978.

6797 FULLY AUTOMATIC COMPUTER-ASSISTED PANCREAS IMAGING. (Eng.) Zurowski, S.; Graban, W. T.; Jakubowski, W. (Medical Acad. Warsaw, Banacha 1A, Warsaw, Poland). *Eur. J. Nucl. Med.* 2(4):273-275; 1977.

6798 HOW OFTEN DOES BACTERAEMIA OCCUR FOLLOWING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY (ERCP)? (Eng.) Lam, S. K.; Tsui, J. K. C.; Chan, P. K. W.; Wong, K. P.; Ong, G. B. (Dept. Medicine, Univ. Hong Kong, Hong Kong). *Endoscopy* 9(4):231-234; 1977.

6799 VISUALIZATION OF THE AREAE GASTRICAE IN A DOUBLE CONTRAST EXAMINATION--DEPENDENCE ON THE CONTRAST MEDIUM. (Eng.) Kormano, M.; Makela, P.; Rossi, I. (Central Hosp., 20520 Turku 52, Finland). *Fortschr. Roentgenstr.* 128(1):52-56; 1978.

6800 DETERGENT ALTERED ALKALINE PHOSPHATASE PATTERNS OF LIVER DISEASE. (Eng.) Epstein, E.; Baginski, E. S.; Zak, B. (William Beaumont Hosp., Royal Oak, MI 48072). *Ann. Clin. Lab. Sci.* 8(1):34-41; 1978.

6801 [1-^{11}C]DL-VALINE, A POTENTIAL PANCREAS-IMAGING AGENT. (Eng.) Washburn, L. C.; Wieland, B. W.; Sun, T. T.; Hayes, R. L.; Butler, T. A. (Medical and Health Sciences Div., Oak Ridge Associated Univ., P.O. Box 117, Oak Ridge, TN 37830). *J. Nucl. Med.* 19(1):77-83; 1978.

6802 A COMPARISON OF COLONOSCOPY AND ROENTGENOGRAPHY FOR DETECTING POLYPOID LESIONS OF THE COLON. (Eng.) Leinicke, J. L.; Dodds, W. J.; Hogan, W. J.; Stewart, E. T. (Medical Coll. Wisconsin, Milwaukee, WI). *Gastrointest. Radiol.* 2(2): 125-128; 1977.

6803 THE DIAGNOSTIC VALUE OF PERCUTANEOUS LIVER BIOPSY IN PATIENTS WITH NON HODGKIN'S LYMPHOMA--A PRELIMINARY REPORT. (Eng.) Kolaric, K.; Roth, A.; Dominis, M.; Jakasa, V. (Central Inst. Tumors and Allied Diseases, Zagreb, Ilica 197 41000, Yugoslavia). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):440-443; 1977.

6804 COMPARISON BETWEEN BOLUS INJECTION AND INFUSION OF SECRETIN AND PANCREOZYMIN IN THE DIAGNOSIS OF CHRONIC PANCREATIC DISEASE (ONE HOUR TEST). (Eng.) Farini, R.; Del Favero, G.; Adorati, M.; Pedrazzoli, S.; Fabris, G.; Giordano, P.; *et al.* (Clinica Medica I, Universita di Padova, 35100 Padova, Italy). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):462-468; 1977.

6805 DIAGNOSTIC TOOLS IN THE MANAGEMENT OF CHRONIC PANCREATITIS. (Eng.) Mullens, J. E.; Salem, S. (Ottawa Civic Hosp., 1053 Carling Ave., Ottawa, Ontario K1Y 4E9, Canada). *Can. J. Surg.* 21(1):60-63; 1978.

6806 PRE-MEDICATION FOR ENDOSCOPY: A TRIAL OF ATROPINE, PENTAZOCINE OR PETHIDINE AS A SUPPLEMENT TO DIAZEPAM. (Eng.) Cook, P. J.; Bennett, P. N.; Lennard-Jones, J. E.; Warnes, T. W. (Univ. Coll. Hosp., London, England). *Scand. J Gastroenterol.* 13(1):33-39; 1978.

6807 A COMPARISON OF A NEW NON-IONIC (METRIZAMIDE) AND A DISSOCIABLE (METRIZOATE) CONTRAST MEDIUM IN ENDOSCOPIC RETROGRADE PANCREATOGRAPHY (ERP). (Eng.) Osnes, M.; Skjennald, A.; Larsen, S. (Ulleval Hosp., Oslo 1, Norway). *Scand J. Gastroenterol.* 12(7):821-825; 1977.

See also, 6762, 6810, 6820, 6833, 6837, 6877, 6887
6894, 6906, 6919, 6933, 6937, 6938, 6939
6942, 6945, 6951, 6966, 6974, 6982, 6984
6985, 6989, 7030, 7031, 7036, 7038, 7043
7045, 7054, 7060, 7071, 7072, 7076, 7078
7081, 7083, 7084, 7115, 7128, 7138, 7160
7172, 7173, 7174, 7175, 7176, 7183, 7187
7191, 7192, 7200, 7205, 7211, 7216, 7239
7245, 7246, 7261, 7268.

GASTROINTESTINAL DISEASES

ESOPHAGUS

6808 ESOPHAGEAL ATRESIA WITH DOUBLE TRACHEOESOPHAGEAL FISTULA. (Eng.) Goodwin, C. D.; Ashcraft, K. W.; Holder, T. M.; Johnson, F. R.; Amoury, R. A. (190 Grant St., Dayton, OH 45404). *J. Pediatr. Surg.* 13(3):269-273; 1978.

Four cases of esophageal atresia (EA) with double tracheoesophageal fistula (TEF) are presented, and the relevant literature is reviewed. All patients were boys, weighing 2,735 to 3,150 g. The first patient had an EA and distal TEF, which were treated by dividing the distal fistula and performing a single layer esophagoesophagostomy, using the extrapleural approach. A second TEF was found 9 days later at the C-7 level. In retrospect, the preoperative contrast swallow showed both a proximal and distal TEF. The upper fistula was divided through a transcervical approach. Transient paresis of the right recurrent laryngeal nerve complicated the infant's postoperative course. The second infant was also found to have a second TEF following surgery for EA and distal TEF. This TEF was discovered by esophagoscopy, following the injection of methylene blue into the endotracheal tube. Severe subglottic stenosis and tracheomalacia complicated this patient's course following surgery for the second TEF. A proximal TEF was discovered in the third patient during surgery for EA and distal TEF. Both fistulas were divided, and an esophageal anastomosis was performed under slight tension. He later had a fundoplication for an anastomotic stricture associated with severe gastroesophageal reflux. The last patient had definitive repair for EA and distal TEF delayed until the fourth day of life because of pneumonitis. At operation, the esophagus was in continuity but had a membranous atresia. A large distal TEF was divided, but because the atresia was membranous, the proximal esophagus was not mobilized. Esophagram and bronchoscopy following subsequent repeated episodes of respiratory infections associated with choking while feeding revealed a proximal fistula. A literature review, together with the present cases, suggests that TEF may be more common than is generally recognized and that diagnosis is difficult. During repair of EA and TEF, the proximal esophagus should be mobilized to detect additional TEF. The results of treatment should be good, since this problem occurs in large babies with fewer and less complex associated conditions.

6809 PANETH CELLS IN BARRETT'S ESOPHAGUS. (Eng.) Schreiber, D. S.; Apstein, M.; Hermos, J. A. (West Roxbury Veterans Admin. Hosp., Boston, MA). *Gastroenterology* 74(6):1302-1304; 1978.

Four patients with clinical and endoscopic evidence of inflammation or benign stricture of the esophagus in whom Paneth cells were identified in Barrett's epithelium of the specialized columnar type are reported. The cells were identical to human intestinal Paneth cells by light microscopy, electron microscopy, and histochemical staining reactions. A retrospective review of biopsies from eight additional patients with esophageal specialized columnar epithelium yielded two further cases with Paneth cells. The presence of Paneth cells, along with goblet cells, suggests that specialized columnar epithelium in the esophagus may be a form of highly differentiated intestinalization.

6810 LASER COAGULATION IN ACUTE GASTROINTESTINAL HEMORRHAGE. (Ger.) Kiefhaber, P.; Nath, G.; Moritz, K.; Kreitmair, A. (Medizinische Klinik der Innenstadt der Universitat, Ziemssenstr. 1, D-8000 Munchen 2, W. Germany). *Langenbecks Arch. Chir.* 345:303-306; 1977.

Emergency endoscopic coagulation with a Nd-Yag laser was performed in 198 acute gastrointestinal hemorrhages in 156 unselected patients with recurrent hemorrhages during a 1- to 5-yr period. It was possible to control the hemorrhage in 186 instances, which included 60 massive and protracted hemorrhages from varices of the esophagus, cardia, and stomach; 10 arterial and 4 capillary-venous hemorrhages in Mallory-Weiss syndrome; 57 arterial and 40 venous-capillary hemorrhages from esophageal, gastric, duodenal, and jejunal ulcers; 11 hemorrhages in multiple esophageal and gastric erosions; and 4 arterial and venous hemorrhages from colonic ulcers. Recurrent hemorrhages were seen in 18 patients with varices 3-30 days after laser coagulation; all defects were new. Recurrent hemorrhage from the coagulated defect was seen in only one patient (with Mallory-Weiss syndrome). The findings indicate the great value of endoscopic laser coagulation of gastrointestinal hemorrhage.

6811 GASTROESOPHAGEAL REFLUX IN INFANTS AND CHILDREN: A USEFUL CLASSIFICATION AND RELIABLE PHYSIOLOGIC TECHNIQUE FOR ITS DEMONSTRATION. (Eng.) McCauley, R. G. K.; Darling, D. B.; Leonidas, J. C.; Schwartz, A. M. (New England Medical Center Hosp., 171 Harrison Ave., Boston, MA 02111). *Am. J. Roentgenol.* 130(1):47-50; 1978.

A radiologic method for the demonstration of gastroesophageal reflux in children is described, and a clinically useful system for grading of reflux is presented. Colloidal barium sulfate (100 g in 200 ml water) is administered in a volume similar to a normal meal, and then spot films are taken in the lateral and supine positions to evaluate the swallowing mechanism and the contour and peristalsis of the barium-filled esophagus. Routine fluoroscopy and spot films of the stomach and duodenum are obtained with partial distention of the stomach. Additional barium is given, following which the gastroesophageal junction is examined using intermittent fluoroscopy and small fields and while turning the subject gently from side to side in a supine position. Reflux, if present, will be seen in the majority of cases at this time, and its maximum extent can be recorded. Having the subject suck on a rubber nipple may aid in the demonstration of reflux. In the absence of reflux, hiatal hernia is looked for using thickened barium (75 g/25 ml water). After the subject has sat erect for 30 min, a delayed film is taken in the supine position and should include the lower half of the esophagus. The overall incidence of reflux in 507 patients was 40%; it was 64% among infants <3 months old. Most patients with reflux (70%) were under 1 yr of age. The grading system ranges from reflux into the distal esophagus only (grade 1) to reflux with aspiration into the trachea and lungs (grade 5). This method and system may be useful in understanding the true incidence and significance of gastroesophageal reflux.

6812 ESOPHAGEAL EPITHELIAL RESPONSE TO GASTROESOPHAGEAL REFLUX: A QUANTITATIVE STUDY. (Eng.) Johnson, L. F.; Demeester, T. R.; Haggitt, R. C. (Walter Reed Army Medical Center, Washington, DC 20012). *Am. J. Dig. Dis.* 23(6):498-509; 1978.

To examine the relationship between esophageal mucosal exposure to gastric acid, exposure of the distal esophageal mucosa to gastric juice was quantitated by 24-hr pH monitoring in 100 individuals and was correlated with morphologic data derived from esophageal biopsies. The degree of acid exposure to the distal esophagus (time exposed to pH <4) correlated directly with increases in both relative and absolute length of the subepithelial papillae ($r=0.333$, $p<0.01$ and $r=0.305$, $p<0.01$, resp.) and to relative basal zone hyperplasia ($r=0.261$, $p<0.05$). Both papillary length and basal zone hyperplasia decreased after antireflux surgery had reduced acid exposure to normal in the five patients studied. Reflux in the recumbent position resulted in prolonged exposure of the mucosa to acid because of poor acid clearing from the esophagus. This exposure caused longer papillae than did upright reflux, where there were more frequent reflux episodes, but with rapid acid clearance. The presence of a hiatal hernia was associated with longer papillae, lower distal esophageal sphincter pressure, increased reflux frequency, and prolonged recumbent acid clearance. Twenty-four hour pH monitoring correlated better with papillary length ($r=0.250$, $p<0.05$) than did symptoms or other clinical measures of gastroesophageal reflux. This study shows that the pH of refluxed gastric juice serves as a sensitive tag to assess two important determinants of reflux esophagitis: (a) reflux frequency secondary to incompetency of the cardioesophageal junction and (b) esophageal clearing of the refluxed gastric juice. Both of these components must be assessed in the future in determining benefit from a potential therapeutic measure.

6813 SURGICAL ACCOMPLISHMENTS IN ENHANCING LOWER ESOPHAGEAL SPHINCTERIC COMPETENCY. (Eng.) Woodward, E. R. (Univ. Florida Coll. Medicine, Gainesville, FL 32611). *South. Med. J.* 71 (Suppl. 1):38-40; 1978.

6814 COMPARISON OF ENDOSCOPY AND MANOMETRY IN ASSESSMENT OF LOWER ESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Rafoth, R. J.; Freeland, G.; Pailey, P.; Anderson, D. S.; Fornes, M. F. (Naval Regional Medical Center, San Diego, CA 92134). *Gastrointest. Endosc.* 24(4):152-153; 1978.

6815 COMPARISON OF FIBEROPTIC ENDOSCOPE AND QUINTON TUBE ESOPHAGEAL BIOPSIES IN ESOPHAGITIS. (Eng.) Komorowski, R. A.; Leinicke, J. A. (Medical Coll. Wisconsin, 8700 W. Wisconsin Ave., Milwaukee, WI 53226). *Gastrointest. Endosc.* 24(4):154-155; 1978.

6816 SPONTANEOUS INTRAMURAL HEMATOMA OF ESOPHAGUS. (Eng.) Atefi, D.; Horney, J. T.; Eaton, S. B.; Shulman, M.; Whaley, W.; Galambos, J. T. (Emory Univ. Sch. Medicine, 69 Butler St., S.E., Atlanta, GA 30303). *Gastrointest. Endosc.* 24(4):172-174; 1978.

6817 OESOPHAGEAL VARICEAL BLEEDING IN FELTY'S SYNDROME ASSOCIATED WITH NODULAR REGENERATIVE HYPERPLASIA. (Eng.) Blendis, L. M.; Lovell, D.; Barnes, C. G.; Ritland, S.; Cattan, D.; Vesin, P. (Toronto General Hosp., Toronto, Ontario M5P 2J2, Canada). *Ann. Rheum. Dis.* 37:183-186; 1978.

6818 RESULTS OF INTERPOSITION "H" GRAFTS FOR PORTAL HYPERTENSION. (Eng.) Thompson, B. W.; Casali, R. E.; Read, R. C.; Campbell, G. S. (Veterans Admin. Hosp., 300 E. Roosevelt Rd., Little Rock, AR 72206). *Ann. Surg.* 187(5):515-520; 1978.

6819 BOERHAAVE'S SYNDROME. (Eng.) Landay, M. J.; Berk, R. N. (Univ. Texas Southwestern Medical Sch., Dallas, TX). *Am. J. Gastroenterol.* 69(2):212-219; 1978.

6820 AIR IN THE ESOPHAGUS: A FREQUENT RADIOLOGIC FINDING. (Eng.) Proto, A. V.; Lane, E. J. (Wilford Hall U.S. Air Force Medical Center, Lackland Air Force Base, TX 78236). *Am. J. Roentgenol.* 129(3):433-440; 1977.

6821 RADIOLOGIC ASPECTS OF BECK GASTRIC TUBE IN ESOPHAGEAL RECONSTRUCTION. (Eng.) Fetouh, S. A.; Daffner, R. H.; Postlethwait, R. W.; Millar, R. C. (Duke Univ. Medical Center, Durham, NC 27710). *Am. J. Roentgenol.* 129(3):425-431; 1977.

6822 THE JET PHENOMENON: A MANIFESTATION OF ESOPHAGEAL WEB. (Eng.) Shauffer, I. A.; Phillips, H. E.; Sequeira, J. (Boston Univ.

Sch. Medicine, 818 Harrison Ave., Boston, MA 02118). *Am. J. Roentgenol.* 129(4):747-748; 1977.

6823 PRIMARY ULCERATIVE CARCINOMA OF THE ESOPHAGUS. (Eng.) Gloyna, R. E.; Zornoza, J.; Goldstein, H. M. (Univ. Texas System Cancer Center, Houston, TX 77030). *Am. J. Roentgenol.* 129(4):599-600; 1977.

6824 ACUTE UPPER GASTROINTESTINAL BLEEDING DUE TO AORTOESOPHAGEAL FISTULA, DUE TO BOECK'S SARCOID. (Eng.) Staves, N. P. (South Side Medical-Surgical Clinic, Milwaukee, WI). *Abdom. Surg.* 19(9):206-207; 1977.

6825 INTRALUMINAL DIVERTICULUM OF THE ESOPHAGUS. (Eng.) Schreiber, M. H.; Davis, M. (Univ. Texas Medical Branch, Galveston, TX 77550). *Am. J. Roentgenol.* 129(4):595-597; 1977.

6826 EXPERIMENTAL FUNDOPLICATION: COMPARISON OF RESULTS OF DIFFERENT TECHNIQUES. (Eng.) Leonardi, H. K.; Ellis, F. H., Jr.; Cormack, J.; Gorrilla, M. (Lahey Clinic Foundation, 605 Commonwealth Ave., Boston, MA 02215). *Surgery* 82(4):514-520; 1977.

6827 THE RADIOLUCENT ESOPHAGEAL FOREIGN BODY: AN OFTEN-FORGOTTEN CAUSE OF RESPIRATORY SYMPTOMS. (Eng.) Newman, D. E. (Vancouver General Hosp., 855 W. 12th Ave., Vancouver, British Columbia V5Z 1M9, Canada). *J. Pediatr.* 92(1):60-63; 1978.

6828 INTRAOPERATIVE MEASUREMENT OF LOWER ESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Hill, L. D. (Mason Clinic, 1118 Ninth Ave., Seattle, WA 98101). *J. Thorac. Cardiovasc. Surg.* 75(3):378-382; 1978.

6829 AN APPROACH TO THE SURGICAL TREATMENT OF CARCINOMA OF THE OESOPHAGUS AND CARDIA. (Eng.) Gatzinsky, P.; Bergh, N. P.; Dernevik, L.; Larsson, S. (Sahlgren's Hosp., Goteborg, Sweden). *Acta Chir. Scand.* 143(6):341-345; 1977.

6830 MEGAESOPHAGUS AND PNEUMONIA ASSOCIATED WITH Mycobacterium chelonei: A CASE REPORT AND A LITERATURE REVIEW. (Eng.) Burke, D. S.; Ullian, R. B. (Walter Reed Army Inst. Res., Washington, DC 20012). *Am. Rev. Respir. Dis.* 116(6):1101-1107; 1977.

6831 THE SIGNIFICANCE OF RIGHT AORTIC ARCH IN REPAIR OF ESOPHAGEAL ATRESIA AND TRACHEO-ESOPHAGEAL FISTULA. (Eng.) Harrison, M. R.; Hanson, B. A.; Mahour, G. H.; Takahashi, M.; Weitzman, J. J. (Children's Hosp. Los Angeles, 4650 Sunset Blvd., Los Angeles, CA 90027). *J. Pediatr. Surg.* 12(6):861-869; 1977.

6832 ACHALASIA OF THE OESOPHAGUS TREATED BY PNEUMATIC DILATATIONS, HELLER-OPERATION AND COLON INTERPOSITION. (Eng.) Van Walleghem, J.; Booy, A. Ph.; Van Houten, H. (Good-Engels Children's Hosp., Antwerp, Belgium). *Acta Chir. Belg.* (6):539-552; 1977.

See also, 6602, 6790, 6791, 6850, 6888, 6889, 6892, 6941, 7221, 7242.

STOMACH

6833 THE ORIGIN OF THE LEFT GASTRIC ARTERY. (Eng.) Naidich, J. B.; Naidich, T. P.; Sprayregen, S.; Hyman, R. A.; Pudlowski, R. M.; Stein, H. L. (North Shore Univ. Hosp., 300 Community Drive, Manhasset, NY 11030). *Radiology* 126(3):623-626; 1978.

To investigate variations in the origin of the left gastric artery (LGA), the origin and visualization of the artery were evaluated retrospectively in 500 consecutive angiograms that included at least one selective study of the celiac trunk or the leinogastric trunk. If there was any doubt about the visualization or origin, the LGA was considered as not visualized. The LGA could not be identified in 40 cases. In nine cases, the LGA originated directly from the aorta, and the phrenic artery arose as a branch of the LGA. In one case, the LGA originated from the superior mesenteric artery. In 450 cases, the LGA arose from the celiac or leinogastric trunk, and the orifice was well seen in 378. The orifice was visible in 218/220 patients in whom both anteroposterior and right posterior oblique projections were obtained but in only 160/230 in whom only the anteroposterior projection was obtained. In 373/378 patients, the LGA was a single vessel arising from the celiac or leinogastric trunk anywhere between its origin and its bifurcation into the hepatic and splenic arteries; in 1, the LGA arose from the splenic artery; in 2, it arose from the hepatic artery; and in 2 patients, 2 LGAs of almost equal caliber arose from the celiac artery. In 102 patients, the LGA supplied both the stomach and the liver to varying extents. Anomalous origin of the LGA can lead to failure to visualize it in arteriograms or to complications in catheterization therapy of gastrointestinal hemorrhage.

6834 DOUBLE CHANNEL PYLORUS. (Eng.) Jamshidnejad, J.; Koehler, R. E.; Narayan, D. (Washington Univ. Sch. Medicine, St. Louis, MO 63110). *Am. J. Roentgenol.* 130(6):1047-1050; 1978.

The radiographic and clinical features in five patients with double channel pylorus are presented and compared with those in previously reported cases of this deformity. The patients ranged in age from 64 to 76 yr. The anomaly was confirmed endoscopically in four patients and at surgery in one. All patients had epigastric pain and symptoms consistent with peptic ulcer disease. None exhibited evidence of gastric outlet obstruction. Three patients underwent gastrectomy. The radiographic examination revealed barium outlining two channels connecting the antrum with the base of the duodenal bulb in all cases. A fistulous channel passed through the lesser curvature aspect of the pylorus and entered the superior fornix of the duodenal bulb. The two channels were separated by a bridge or septum. In each case, an ulcer crater was seen along the superior aspect of the prepyloric antrum or duodenal bulb. Since the double channel pylorus was shown not to have been present on prior upper gastrointestinal radiographs or endoscopy in 15 previous and 2 current cases and since most cases occur in older subjects, the lesion is probably an acquired peptic deformity in most instances.

6835 UPPER GASTROINTESTINAL BLEEDING IN THE INTENSIVE CARE UNIT. (Eng.) MacDonald, A. S.; Pyne, D. A.; Freeman, A. N. G.; Holland, S. G.; Badley, B. W. D. (Clinical Res. Center, 5849 University Ave., Halifax, Nova Scotia B3H 1W2, Canada). *Can. J. Surg.* 21(1):81-84; 1978.

The pathogenesis, diagnosis, and treatment of upper gastrointestinal bleeding secondary to conditions requiring intensive care are summarized. The clinical conditions that precede erosive gastritis are shock, sepsis, organ failure (kidney, liver, lung), drug ingestion (acetylsalicylic acid, alcohol, corticosteroids), and elevated intracranial pressure, and in the majority of patients, more than one factor is involved. Those patients that bleed from the erosions are distinguished from those who do not by continuation of the stressful situation that led to the erosions. The mechanisms of these pathogenetic conditions are not entirely clear. Bleeding is the identifying symptom of erosive gastritis; the most important diagnostic tool is fiberoptic endoscopy. Barium contrast roentgenography is not helpful. At endoscopy, early in the illness, one finds numerous punctate areas of hemorrhage, typically most intense along the lesser curvature and over the posterior wall of the fundus. The antrum is often spared, but the duodenum is often involved, sometimes alone. As the illness progresses, the erosions enlarge and coalesce, forming a large serpiginous shallow ulcer, and they may deepen. The drug-precipitated entity responds to simple lavage with ice water and oral antacids. Treatment of other patients has not been consistently successful. The histamine H_2-receptor antagonist, cimetidine, was used in an uncontrolled trial in 27 patients with erosive gastritis; bleeding stopped in 24. Based on clinical experiences with both metiamide and cimetidine, the authors recommend conservative surgery. In those who continue to bleed despite the administration of H_2 blockers, discrete ulcers are present that can be managed by suture ligation or excision, followed by vagotomy and drainage and continuous cimetidine therapy until the stressful situation has passed.

6836 GASTRIC STUMP CANCER: STATISTICAL EVALUATION. (Eng.) Cheli, R.; Molinari, F.; Santi, L.; Ciancamerla, G.; Puntoni, R. (Ospedale Generale Regionale, Viale Benedetto XV, 16132 Genova, Italy). *Rend. Gastroenterol.* 9(3): 169-172; 1977.

To determine the relationship between gastric surgery and the development of gastric stump cancer, the mortality due to cancer and other causes was analyzed in 180 patients who underwent resection for gastric ulcer and 337 patients who underwent resection for duodenal ulcer. The mortality rate for gastric stump cancer was 2% in the patients who underwent resection for duodenal ulcer and 5% for those who underwent surgery for gastric ulcer. A statistical analysis showed a highly significant increase ($p<0.001$) in mortality, in relation to the total population of Genoa, for gastric stump cancer in both groups. There was also a significantly higher ($p<0.005$) mortality from extragastric tumors among the patients who underwent surgery for ulcer than in the general population.

6837 PLASMACYTOMA OF THE STOMACH. (Eng.) Scott, F. E. T.; Dupont, P. A.; Webb, J. (Wexham Park Hosp., Slough, Berkshire, England). *Cancer* 41(2):675-681; 1978.

Three cases of undoubted plasma cell tumor of the stomach that had been diagnosed histologically were re-examined by the immunoperoxidase (IP) staining technique to confirm the diagnosis by demonstrating a single type of immunoglobulin in the tumor cell using formalin-fixed, paraffin-embedded tissue from the original biopsies. The detailed case reports are presented. Sections of benign plasma cell granuloma were used as a nonspecific positive control. One patient with a tumor that was confined to the stomach and one in whom a palliative partial gastrectomy had been performed for the removal of a large tumor of the distal third of the stomach with extensive lymphatic but no skeletal involvement had tumor cells that stained eavily with the IP technique, revealing high conentration of Russell bodies that contained exlusively IgG heavy chains and K-type light chains. lood and urine specimens from the second patient ad shown no excess of a single immunoglobulin type. P staining of tissue from a patient with plasmaytoma of the stomach in which a dense mass of alignant plasma cells extended completely through he muscle layer and in whom skeletal involvement ccurred 2 yr after resection revealed exclusively gA heavy chains and K-type light chains but no ussell bodies. Sixty-six cases of primary gastric umor reported in the literature are reviewed, and he pathology of plasma cell tumors is discussed. he demonstration of intracellular immunoglobulins ermits a firm distinction to be made between true lasma cell tumors and reactive plasma cell granuomas on the one hand and the other types of maligant lymphoma on the other.

838 ACUTE GASTRIC DILATATION IN NEGLECTED CHILDREN. (Eng.) Franken, E. A.; Fox, .; Smith, J. A.; Smith, W. L. (Indiana Univ. Medial Center, 1100 West Michigan St., Indianapolis, N 46202). *Am. J. Roentgenol.* 130(2):297-299; 1978.

cute gastric dilatation as a manifestation of hild neglect and abuse is reported. Acute sudden astric dilatation developed in each of five chilren (ages 2-8 yr) after the ingestion of a large eal. The height and weight of all patients were elow the third percentile, and all had "voracious" r "huge" appetites, and historic evidence of deprivation and/or of neglect, and physical abuse. The athogenesis of acute gastric atony in the deprived hild is related to structural and functional changes n the stomach due to chronic starvation. Treatent of the gastric distention involves decompreson of the stomach by nasogastric intubation, apropriate i.v. fluids to counteract shock, and slow esumption of small but frequent p.o. feedings after 2-24 hr. Radiographic recognition of acute gastric ilatation in a child who is not postoperative or ntoxicated should suggest the presence of chronic tarvation and child neglect. Prevention of further eglect requires social management of the entire amily.

839 THE FURTHER INVESTIGATION ON THE GASTRIC ACID SECRETION IN THE PRIMARY HYPERPARAHYROIDISM. (Eng.) Segawa, K.; Nakazawa, S.; aito, Y.; Imai, K.; Yamase, H.; Yamada, K.; *et al.* Nagoya Univ. Sch. Medicine, Tsuruma-cho, Showa-ku, agoya, 466 Japan). *Gastroenterol. Jpn.* 12(5):347-51; 1977.

astric output was studied in 11 patients with hyerparathyroidism before and 10-114 days after arathyroidectomy to further investigate the relationship between serum calcium level on one hand and serum gastrin level and gastric secretion on the other. The serum calcium level fell significantly after the operation (from 5.96 ± 0.18 mEq/l to 4.19 ± 0.17 mEq/l, $p<0.001$). The serum gastrin level, basal gastric output (BAO), and maximal gastric output (MAO) also decreased significantly after operation (from 167.00 ± 7.08 to 73.40 ± 24.21 pg/ml, from 1.74 ± 0.64 to 0.42 ± 0.26 mEq/hr, and from 5.66 ± 2.29 to 2.13 ± 1.45 mEq/hr, resp., $p<0.05$, $p<0.001$, and $p<0.02$, resp.). Serum alkaline phosphatase (AP) activity appeared to be an indicator of the duration of the disease, rising with longer durations. In patients with AP activity >20 Kind-King (KK) U, BAO and MAO were 1.00 ± 0.55 and 4.86 ± 2.46 mEq/hr, resp.; in patients with AP activity <20 KKU, BAO and MAO were 1.87 ± 0.97 and 8.43 ± 3.43 mEq/hr, resp. In five of the patients, the BAO and MAO were measured a second time between 67 and 391 days after the first postoperative study; both values had increased compared with the first study results, and both approached preoperative values. The authors postulate that the adaptation of the parietal cell to hypercalcemia prior to operation (i.e., producing normal gastric secretion levels despite the elevated stimulus) leads to decreased secretion after operation because of the lowered serum calcium level and then as the parietal cells readapt over time to the new level of serum calcium, the gastric secretion increases to normal.

6840 RECURRING HYPERPLASTIC GASTRIC POLYPS FOLLOWING SUBTOTAL GASTRECTOMY. (Eng.) Joffe, N.; Goldman, H.; Antonioli, D. A. (Harvard Medical Sch., 300 Brookline Ave., Boston, MA 02215). *Am. J. Roentgenol.* 130(2):301-305; 1978.

The clinical, radiologic, and pathologic findings in two cases of recurring symptomatic hyperplastic gastric polyps after subtotal gastrectomy are presented. In a 30-yr-old woman, the initial surgery was undertaken for treatment of peptic ulcer disease. In a 34-yr-old woman, a patient with known pernicious anemia, the indication for surgery was multiple antral polyps. Within 2 yr after surgery, both patients developed multiple hyperplastic polyps in the gastric remnant. Repeated endoscopic and barium examinations over a 7- to 8-yr period revealed a progressive increase in the size and number of these polyps with formation of large conglomerate masses in the gastric remnant immediately proximal to the gastrojejunostomy stoma. Surgical or transendoscopic removal of the polyps was indicated by severe symptoms on several occasions: the first patient experienced intermittent epigastric pain, vomiting, and gastrointestinal hemorrhage; during one episode of severe vomiting, an entire polyp was ejected; and the second patient had symptoms of intermittent gastric outlet obstruction produced by prolapse of a large polyp through the stoma into the jejunum. It is proposed that reflux bile gastritis may have played an important etiologic role in the development of these recurring hyperplastic polyps.

6841 ELECTRON MICROSCOPIC OBSERVATIONS IN INFANTILE HYPERTROPHIC PYLORIC STENOSIS (IHPS). (Eng.) Jona, J. Z. (411 East Mason St., Milwaukee, WI 53202). *J. Pediatr. Surg.* 13(1): 17-20; 1978.

The ultrastructural appearance of the parasympathetic ganglia, the supporting interstitial cells, and smooth muscles in infantile hypertrophic pyloric stenosis (IHPS) is summarized. Tissue obtained at pyloromyotomy from five infants (ages 3-5 weeks) with typical clinical, radiologic, and operative findings of IHPS and from 2-week-old infant rabbits, adult rabbits, and rats was prepared for electron microscopic examination. In all, 35 plexuses of human origin were studied in this material, and the animal material permitted evaluation of the morphology and maturation changes in the pyloric ganglia. On the whole, no abnormalities were found in the neurons or interstitial cells of the infants. Occasionally (<10% of the total), a very large axon was observed, measuring 2-3 times the diameter of normal large axons. Intrinsic derangement of the organelles and axolemma of these axons was seen. The cytoplasm of the supporting cells contained small filaments and radiating processes that enveloped a group of axons or part of the neuron's surface. There was a marked increase in the overall thickness of the circular smooth muscles of the pylorus. The animal control material resembled the human material in most respects. The small, immature ganglia in the infant rabbits, which resembled those in the babies, disappeared in the older animals, suggesting that the maturation process followed a normal course in babies with IHPS. It is concluded that degenerative changes or failure of maturation of the ganglia cannot account for the clinical syndrome of IHPS.

6842 CONGENITAL HYPERTROPHIC PYLORIC STENOSIS: THE ROLE OF GASTRIN REEVALUATED. (Eng.) Werlin, S. L.; Grand, R. J.; Drum, D. E. (Children's Hosp. Medical Center, 300 Longwood Ave., Boston, MA 02115). *Pediatrics* 61(6):883-885; 1978.

To evaluate the potential role of gastrin in the etiology of congenital hypertrophic pyloric stenosis, serum gastrin levels were measured in cord blood of affected infants, matched controls, and mothers of both. Cord and maternal sera were available from 40 of the 51 maternal-infant pairs in which pyloric stenosis developed in the infant in a study of 59,508 pregnancies. No differences were identified when values from infants with pyloric stenosis were compared with those from control infants (117 ± 10 and 115 ± 8 pg/ml, resp.). The mean cord serum gastrin level of all infants (116 ± 9 pg/ml) was significantly greater than the mean maternal gastrin level (93 ± 8 pg/ml, $p<0.001$). The data effectively dismiss the possibility that elevated serum gastrin concentration in mother or infant at the time of delivery can be implicated as a cause of congenital pyloric stenosis.

6843 TRIMIPRAMINE IN THE TREATMENT OF GASTRIC ULCER. (Eng.) Valnes, K.; Myren, J.; Qvigstad, T. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 13(4):497-500; 1978.

A double-blind study comparing trimipramine with placebo during 4 weeks of treatment was carried out in 40 patients with confirmed gastric ulcers. The daily dose of trimipramine was 50 mg p.o. given at bedtime. No serious side-effects occurred. After 4 weeks of treatment, endoscopy showed that 12 of the 20 patients receiving trimipramine had completely healed ulcers, while only 4 of the 20 ulcers in the patients who received placebo were healed ($p=0.025$). A significant improvement in the patients' assessment of the results of treatment (i.e., better, unchanged, or worse) was also observed in the patients receiving trimipramine ($p=0.025$). It is assumed that the previously reported antisecretory effect of the drug, together with its sedative and anti-depressant effect, make trimipramine valuable in the treatment of peptic ulcer disease.

6844 GASTRODUODENAL ULCERATION IN RENAL TRANSPLANT PATIENTS. (Eng.) Schweizer, R. T.; Bartus, S. A. (Hartford Hosp., Hartford, CT 06115). *Conn. Med.* 42(2):85-88; 1978.

Gastroduodenal ulceration was reviewed retrospectively in 200 consecutive renal transplant patients, and a prospective study of this entity was undertaken (113 patients enrolled to date) to determine whether antacid therapy and prophylactic gastric surgery can reduce the incidence and severity of this complication. The 200 patients received antacid therapy as often as every hour during the day, concomitant with large doses of steroids and every 2 hr at night. Prophylactic surgery (usually vagotomy and pyloroplasty) were performed in all patients who had a documented duodenal or gastric ulcer prior to receiving the kidney transplant. The patients in the prospective study were similarly treated. Of the 200 patients, 25 developed upper gastrointestinal ulceration following renal transplant, 12 of the 25 had significant hemorrhage, and 2 of the 12 died; all had had infrequent antacid therapy for various reasons preceding the bleeding episode, 9/12 had received very large corticosteroid doses for rejection episodes, and 2/12 had previously undisclosed histories of previous ulcer disease. Of the remaining 13/25 patients, 1 required plication for perforation of a gastric ulcer, and the others responded to increased antacid therapy plus decreased corticosteroid dosage. Of the 113 patients, 9 required treatment for gastrointestinal ulceration (vagotomy and pyloroplasty in 5; vagotomy and antrectomy in 1; plication and then gastrectomy in 1; plication, vagotomy, and pyloroplasty in 1; and cimetidine therapy in 1); all 9 patients lost their transplants. The greatest risk of ulceration appears to occur when the prednisone maintenance dose is >60 mg/day. The incidence of gastrointestinal ulceration can be kept at a minimum through the use of prophylactic surger and antacid administration; preventive measures and aggressive therapy are also important factors in achieving a low mortality.

6845 PREPYLORIC GASTRIC ANTRAL WEB: A PUZZLING EPIDEMIC. (Eng.) Bell, M. J.;

ernberg, J. L.; Keating, J. P.; Moedjona, S.;
cAlister, W.; Shackelford, G. D. (St. Louis Chil-
ren's Hosp., 500 South Kingshighway, St. Louis,
O 63110). *J. Pediatr. Surg.* 13(3):307-313; 1978.

he spectrum of manifestations and appropriate
herapy were studied in an unusual clustering of
8 infants and children in whom a radiographic diag-
osis of antral web was made during a 26-month
eriod. Nonbilious, often projectile vomiting
as the predominant presenting symptom in 24 in-
ants who were less than 6 months of age. The
lder children complained of pain, vomiting, full-
ess after eating, and eructation. The charac-
eristic radiologic finding was a wire-like trans-
erse septum 1-2 cm proximal to the pylorus. Poor
ntral filling was an important early clue in the
adiographic search for the webs. Pyloroplasty
as performed in 20 patients, frequently after
ailure of medical management of symptoms. Co-
xistent congenital abnormalities were present in
28% of patients. A search for environmental and
amilial factors has failed to elucidate any tera-
ogenic influences in this population.

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STOMACH

Peptic Ulcers

6897 CIMETIDINE FOR ULCERS RECURRING AFTER GASTRIC SURGERY. (Eng.) Hoare, A. M.; Jones, E. L.; Hawkins, C. F. (Queen Elizabeth Hosp., Birmingham B15 2TH, England). *Br. Med. J.* 1(6123): 1325-1326; 1978.

The effect of cimetidine therapy was studied in 20 patients with recurrent ulcers following gastric surgery, to discover if this drug will encourage healing of these ulcers even if the acid output is low. Before treatment, the mean peak acid output was 23.4 mmol/hr; five patients had a peak output of less than 10 mmol/hr and three less than 2.5 mmol/hr. Endoscopy was carried out before and after 6 weeks of cimetidine therapy (200 mg t.i.d. with meals and 400 mg at night). Endoscopy was repeated after a further 6 weeks of treatment if the ulcer had not healed during the first 6 weeks. After 6 weeks, 17 ulcers had healed, and after 12 weeks, 19 had healed. The results suggest that cimetidine aids in ulcer healing, even if the acid output is low.

6898 CIMETIDINE FOR RECURRENT ULCER AFTER VAGOTOMY OR GASTRECTOMY: A RANDOMISED CONTROLLED TRIAL. (Eng.) Kennedy, T.; Spencer, A. (Royal Victoria Hosp., Belfast BT12 6BA, Northern Ireland). *Br. Med. J.* 1(6122):1242-1243; 1978.

In a randomized controlled trial, 6 weeks of therapy with cimetidine (1 g/day) was compared with placebo in the treatment of recurrent ulcers after gastrectomy or vagotomy for duodenal ulcer. Healing, assessed endoscopically, was seen in 7 of 12 patients given cimetidine and in 5 of 12 controls. Four controls whose ulcers did not heal were subsequently treated with cimetidine, and in two, the ulcers healed after 6 weeks. Pain recorded by the patient and consumption of alkalis were each slightly but not significantly less in the cimetidine-treated patients. When cimetidine is to be used for recurrent ulceration, the dosage and duration of treatment should probably be increased.

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6910 PROXIMAL GASTRIC VAGOTOMY IN THE TREATMENT OF UNCOMPLICATED DUODENAL ULCER. (Ger.) Starlinger, M.; Marrie, A.; Meyer, Ch.; Hollender, L. F. (I. Chirurgische Univ.-Klinik, Alserstrasse 4, A-1095 Vienna 9, Austria). *Z. Gastroenterol.* 15(8):483-490; 1977.

6911 PRELIMINARY RESULTS WITH HYPERSELECTIVE VAGOTOMY IN THE TREATMENT OF COMPLICATED DUODENAL ULCER. (Fre.) Fourtanier, G.; Lacroix, A.; Tournut, R.; Pascal, J. P.; Escat, J. (Hopital de Purpan, place du Dr. Baylac, 31052 Toulouse Cedex, France). *Ann. Chir.* 31(11):1006; 1977.

6912 PEPTIC ULCER IN UREMIC CHILDREN. (Eng.) Moorthy, A. V.; Chesney, R. W. (Univ. Hosp., 211 Infirmary, 1300 University Ave., Madison, WI 53706). *J. Pediatr.* 92(3):420-421; 1978.

6913 VAGOTOMY AND DRAINAGE FOR ELECTIVE TREATMENT OF PEPTIC ULCERS. (Eng.) McGregor, D. B.; Savage, L. E.; McVay, C. B. (Yankton Clinic, Yankton, SD). *Surg. Gynecol. Obstet.* 146(3):349-352; 1978.

6914 EFFECT OF H_2-RECEPTOR ANTAGONISTS ON GASTRIC ACID SECRETION AND SERUM GASTRIN CONCENTRATION: A REVIEW. (Eng.) Richardson, C. T. (Univ. Texas Southwestern Medical Sch., Dallas, TX 75235). *Gastroenterology* 74(2, Part 2):366-370; 1978.

6915 CIMETIDINE IN THE TREATMENT OF DUODENAL ULCER: REVIEW AND COMMENTARY. (Eng.) Winship, D. H. (Univ. Missouri, Sch. Medicine, Columbia, MO 65201). *Gastroenterology* 74(2, Part 2): 402-406; 1978.

6916 LONG TERM CIMETIDINE IN THE MANAGEMENT OF SEVERE DUODENAL ULCER DYSPEPSIA. (Eng.) Gray, G. R.; Smith, I. S.; Mackenzie, I.; Gillespie, G. (Victoria Infirmary, Glasgow, Scotland). *Gastroenterology* 74(2, Part 2):397-401; 1978.

6917 SYMPOSIUM ON PEPTIC ULCER DISEASE. 1. MEDICAL TREATMENT OF PEPTIC ULCER. (Eng.) Jeejeebhoy, K. N. (Dept. Medicine, Univ. Toronto, Rm. 6352, Medical Sciences Building, Toronto, Ontario M5S 1A8, Canada). *Can. J. Surg.* 21(1):17-18; 1978.

6918 NEW APPROACHES TO THE PATHOGENESIS OF PEPTIC ULCER BASED ON THE PROTECTIVE ACTION OF SALIVA WITH SPECIAL REFERENCE TO ROUGHAGE, VEGETABLE FIBRE AND FERMENTED MILK PRODUCTS. (Eng.) Malhotra, S. L. (Chief Medical Officer, South Eastern Railway, Calcutta 43, India). *Med. Hypotheses* 4(1):1-14; 1978.

See also, 6633, 6635, 6639, 6644, 6795, 6810, 6834, 6856, 6859, 6878, 6889, 6891, 6966, 7065, 7221, 7222.

SMALL INTESTINE

6919 RADIOLOGICAL MANIFESTATIONS OF SMALL INTESTINAL SOUTH AMERICAN BLASTOMYCOSIS. (Eng.) Avritchir, Y.; Perroni, A. A. (Faculdade de Ciencias Medicas da Santa Casa de Sao Paulo, Sao Paulo, Brazil). *Radiology* 127(3):607-609; 1978.

The small intestinal radiological findings in three cases of South American blastomycosis (SAB), caused by *Paracoccidioides brasiliensis*, are reported. In a 23-yr-old patient, a barium enema revealed a conical, nondistensible cecum and rigid terminal ileum without ulceration. A second patient had dilatation of the intestinal wall in a small bowel series performed at age 20 yr; 4 yr later, a small intestinal series showed multiple long stenotic areas in the jejunum. A barium enema in a 36-yr-old patient revealed contraction at the cecal tip and a distensible terminal ileum with large, somewhat nodular folds. Thus, the radiologic findings of small intestinal SAB are nonspecific, e.g., fixed narrowing and mucosal irregularities. Differential diagnostic possibilities include regional enteritis, tuberculosis, and lymphoma, but when a patient lives in an endemic area, SAB should also be considered. None of the above three cases was correctly diagnosed before laparotomy, when *P. brasiliensis* was always found. A retrospective review of the postmortem findings of 13 patients with SAB during a 6-yr period revealed 3 patients with involvement of the small intestine, supporting the contention that such involvement is more common than has been previously considered.

6920 HEMORRHAGIC DUODENITIS: CLINICAL PROFILE.

(Eng.) Bartolomeo, R. S.; Frank, H. D.; Taubin, H. L. (222 Station Plaza North, Mineola, NY 11501). *N.Y. State J. Med.* 78(2):212-214; 1978.

The clinical findings in 44 patients with hemorrhagic duodenitis are reviewed in a retrospective study. The mean age at presentation was 49.2 yr, and the major symptoms were melena (52.3%), epigastric pain (47.7%), and hematemesis (45.5%). The most common endoscopic findings were marked hyperemia (65.9%), friability (50%), and active hemorrhage (38.6%). The upper gastrointestinal barium meal findings were interpreted as normal in 75% of the 45 upper gastrointestinal series performed. The remainder had radiographic signs confined to the duodenal bulb, consisting of spasticity and irritability of the bulb or hypertrophied duodenal folds. A history of aspirin or aspirin-containing product ingestion was found in 68% of patients 1 week prior to admission. A history of alcohol ingestion was obtained in 34% 1 week prior to admission. Forty-five percent of the patients required blood transfusions, but only one required surgical intervention because of persistent uncontrolled hemorrhage. The only death was in a patient with Bernard-Soulier platelet disorder, while the other 42 cases responded to conservative medical management. Definitive diagnosis of hemorrhagic duodenitis is dependent on direct endoscopic visualization of the mucosa. Cessation of bleeding is to be expected with conservative management.

6921 MALIGNANT LYMPHOMA AND EXTENSIVE VIRAL WART FORMATION IN A PATIENT WITH INTESTINAL LYMPHANGIECTASIA AND LYMPHOCYTE DEPLETION.

(Eng.) Ward, M.; Small, W. P.; Le Roux, A.; Sircus, W. (Western General Hosp., Edinburgh, Scotland). *Postgrad. Med. J.* 53(1626):753-757; 1977.

The case of a patient who developed peripheral mosaic warts and a malignant small bowel lymphoma in association with marked lymphocyte depletion is presented. The patient developed asymmetrical peripheral edema at the age of 12 yr, extensive viral warts at 18 yr, and intestinal lymphangiectasia at 29 yr. The absolute lymphocyte count was 0.8×10^9/l and serum albumin 27 g/l. A low-fat diet and diuretics brought about complete resolution of edema and restoration of the serum albumin to within the normal range. The lymphocyte count remained low and the warts became more extensive on the hands and feet, but the patient remained otherwise asymptomatic until 10 yr later, when he presented with subacute small bowel obstruction. At laparotomy, chylous ascites was found together with gross thickening and hypomotility of the proximal small bowel. A mid-jejunal tumor had narrowed the lumen, and there was a discrete ulcer proximal to it. Obstruction persisted, despite local resection and radiotherapy. Although the patient finally developed extensive abdominal sepsis with bacteremia and died, the warts almost completely disappeared from his hands. The authors propose that the severity of this patient's lymphocyte depletion may account for the appearance of such gross viral warts and ultimately to the complication of small intestinal lymphoma.

6922 RELATIONSHIP BETWEEN 505 PAIRED LIVER TESTS AND BIOPSIES IN 242 OBESE PATIENTS.

(Eng.) Galambos, J. T.; Wills, C. E. (Emory Univ. Sch. Medicine, 69 Butler St., S.E., Atlanta, GA 30303). *Gastroenterology* 74(6):1191-1195; 1978.

Studies were carried out in 242 obese patients to determine how reliably biopsy and liver function tests can detect liver pathology. Liver tests were obtained at the time of the liver biopsy on 242 occasions before jejunoileal bypass, on 105 occasions within 18 months, and on 158 occasions beyond 18 months of surgery. The biopsies were obtained as part of routine evaluation of these patients. Therefore, the selection of the patient or the timing of the biopsy did not depend on the results of the liver tests. Five hundred five liver biopsies were compared with liver tests that were obtained at the time of the biopsy. The biopsy abnormalities were lobular (similar to alcoholic) hepatitis, fibrosis, portal hepatitis, and steatosis. The liver tests were SGOT, alkaline phosphatase, bilirubin, and albumin determinations. For the purpose of the analysis, the severity of histological abnormalities were defined. Biochemical abnormalities were arbitrarily defined at two levels. Level 1 was the standard definition of normal-abnormal for our laboratories. Level 2 considered liver tests abnormal only when these deviated more markedly from normal to simulate the common clinical practice that requires similar or greater abnormalities to consider a patient for liver biopsy. The data were then analyzed in two ways: (1) to describe how often the liver tests were abnormal (or normal) when the biopsy was abnormal (the denominator was the liver biopsy), and (2) conversely, how often the lesions were present in liver biopsies when the liver tests were normal or abnormal (the denominator was the liver test). In 60% to 89% of the patients with abnormal liver biopsy, one or more of the liver tests were also abnormal. However, in 9 of 12 comparisons (4 types of lesions in the 3 time periods), the frequency of abnormal biopsies was not higher in those who had abnormal liver tests. The more severe liver test abnormalities (level 2) had a better association with biopsy abnormalities. However, such severe deviations from normal were seen in only about 12% of the abnormal liver biopsies. It appears that the liver function tests do not measure the functional capacity of the liver in quantitative terms and are not sufficiently reliable to identify correctly and consistently the presence of four types of histological lesions, at least in obese patients.

6923 RAPID DEVELOPMENT OF MICRONODULAR CIRRHOS FOLLOWING SMALL BOWEL BY-PASS FOR OBESITY A FORM OF IATROGENIC NUTRITIONAL CIRRHOSIS?

(Eng.) Spellberg, M. A.; Bermudez, F. (Michael Reese Hosp. and Medical Center, 2900 S. Ellis Ave., Chicago, IL 60616). *Am. J. Gastroenterol.* 68(4):354-358; 1977.

Progressive fatal liver disease in two nonalcoholic women who underwent small bowel bypass for obesity is reported. The patients died 3 and 8 months after surgery, resp. At autopsy, the morphologic changes were indistinguishable from those seen in alcoholic cirrhosis. Advanced micronodular cirrhosis with extensive fibrosis and necrosis, polymorphonuclear leukocyte infiltration, Mallory bodies, and fatty metamorphosis were present in both cases. It is postulated that the nutritional disturbance, including protein deficiency, and large amounts of fatty acids delivered to the liver from the fat depots, results in fatty metamorphosis, the Mallory bodies, and cirrhosis. Bacterial toxins from the excluded loop of intestine may contribute to this process.

6924 THE EFFECT OF STERCULIA BULK ON THE VISCOSITY OF STOMAL OUTPUT FROM TWELVE PATIENTS WITH ILEOSTOMY. (Eng.) Dalhamn, T.; Graf, W.; Nilsson, L. H. (St. Erik's Hosp., 112 82 Stockholm, Sweden). *Scand. J. Gastroenterol.* 13(4):485-488; 1978.

The effect of a commercial bulk preparation (sterculia bulk) on stomal output, water content, and viscosity was studied in 12 patients with ileostomy. The addition of 15 g of sterculia bulk to the diet daily increased the stomal output, in comparison with a control level, by a mean of 92.6 g ($p<0.01$). Dry weight increased by an average of 14.3 g to 72.2 g/24 hr ($p<0.05$). There was a significant decrease in water content ($p<0.05$). Viscosity of the stomal output increased by about 100% ($p<0.01$). Adding bulk to the diet of ileostomized patients may facilitate the management of the stoma by increasing the viscosity of the output.

6925 HERNIATION THROUGH THE FORAMEN OF WINSLOW: REPORT OF A CASE. (Eng.) Schwarz, H. F. (1777 Hamburg Turnpike, Wayne, NJ 07470). *Dis. Colon Rectum* 20(6):521-523; 1977.

6926 COMBINED INTRINSIC AND EXTRINSIC DUODENAL OBSTRUCTION. (Eng.) Bradic, I.; Letica, C.; Pasini, M. (Sch. Medicine, Univ. Zagreb, Kispaticeva 12, 41000 Zagreb [Rebro], Yugoslavia). *Z. Kinderchir.* 21(4):377-381; 1977.

6927 SURGICAL TREATMENT FOR MORBID OBESITY: INFLUENCE OF AGE ON THE INCIDENCE OF POSTOPERATIVE COMPLICATION. (Eng.) Vicuna-Rios, J. M.; eringian, L.; Baylis, S. (Pontiac General Hosp., Pontiac, MI). *Abdom. Surg.* 19(9):186-189; 1977.

6928 INTESTINAL BYPASS, OUR EXPERIENCE. (Eng.) Grassi, G.; Cantarelli, I.; Dell'Osso, A.; recchia, C.; Grassi, G. B. (Ospedali Riuniti, Rome, taly). *Chir. Gastroenterol.* 11(2):197-203; 1977.

6929 A COMMUNITY EXPERIENCE WITH THE SURGICAL TREATMENT OF OBESITY. (Eng.) Garrison, R. N.; Waterman, N. G.; Sanders, G. B. (Univ. Louisville Sch. Medicine, Louisville, KY). *Chir. Gastroenterol.* 11(2):205-212; 1977.

6930 THE PRESENT STATUS OF BYPASS OPERATIONS FOR OBESITY. (Eng.) MacLean, L. D.; Shibata, H. R. (Royal Victoria Hosp., Montreal, Quebec, Canada). *Surg. Annu.* 9:213-230; 1977.

6931 SMALL INTESTINAL BYPASS FOR THE TREATMENT OF MORBID OBESITY. (Eng.) Phillips, R. B. (Barnesville Medical Center, Barnesville, OH). *Surg. Gynecol. Obstet.* 146(3):455-468; 1978.

6932 MEDICAL COMPLICATIONS OF INTESTINAL BYPASS SURGERY. (Eng.) Reynolds, T. B. (Univ. Southern California Sch. Medicine, Los Angeles, CA). *Adv. Intern. Med.* 23:47-59; 1978.

6933 AORTODUODENAL FISTULA: AN UNCOMMON BUT CORRECTABLE CAUSE OF UPPER GASTROINTESTINAL BLEEDING. (Eng.) Dean, R. H.; Allen, T. R.; Foster, J. H.; Mattingly, S.; Clayson, K. R.; Edwards, W. H. (Vanderbilt Univ. Sch. Medicine, Nashville, TN 37232). *Am. Surg.* 44(1):37-43; 1978.

6934 VITAMIN B_{12} ABSORPTION FOLLOWING HUMAN INTESTINAL BYPASS SURGERY. (Eng.) Coyle, J. J.; Varco, R. L.; Buchwald, H. (Univ. Minnesota Hosp., Box 290, Minneapolis, MN 55455). *Am. J. Dig. Dis.* 22(12):1069-1071; 1977.

6935 ROENTGENOGRAPHIC FINDINGS IN WORK HYPERTROPHY OF THE MUSCULARIS PROPRIA OF THE TERMINAL ILEUM. (Eng.) Stelling, C. B.; Straus, F. H. (Univ. Virginia Medical Center, Charlottesville, VA 22901). *Am. J. Dig. Dis.* 22(12):1117-1121; 1977.

6936 VILLOUS ADENOMA OF THE DUODENUM: ENDOSCOPIC DIAGNOSIS AND RESECTION. (Eng.) Dupas, J. L.; Marti, R.; Capron, J. P.; Delamarre, J. (Centre Hospitalier Universitaire, Place Victor Pauchet, F-800030 Amiens Cedex, France). *Endoscopy* 9(4):245-247; 1977.

6937 METHYLENE BLUE INJECTION: AN INTRAOPERATIVE GUIDE IN SMALL BOWEL RESECTION FOR ARTERIOVENOUS MALFORMATION. (Eng.) Fogler, R.; Golembe, E. (Brookdale Hosp., Brooklyn, NY). *Arch. Surg.* 113(2):194-195; 1978.

6938 OBSCURE INTUSSUSCEPTION DIAGNOSED BY ULTRASONOGRAPHY. (Eng.) Uhland, H.; Parshley, P. F. (Emanuel Hosp., 2801 N. Gantenbein Ave., Portland, OR 97227). *JAMA* 239(3):224; 1978.

6939 INTESTINAL DUPLICATION DETECTED WITH TECHNETIUM-99m SODIUM PERTECHNETATE IMAGING OF THE ABDOMEN. (Eng.) Barkley, R. M.; Munoz, O.; Parkey, R. W. (Univ. Texas Southwestern Medical Sch., 5323 Harry Hines Blvd., Dallas, TX 75235). *Am. J. Dig. Dis.* 22(12):1122-1126; 1977.

6940 SODIUM BALANCE FOLLOWING SOAVE ILEO-ENDORECTAL PULL-THROUGH. (Eng.) Schwarz, K. B.; Keating, J. P.; Ternberg, J. L.; Bell, M. J.; Howald, M. A. (Washington Univ. Sch. Medicine, St. Louis, MO). *J. Pediatr. Surg.* 12(6):945-953; 1977.

6941 OBSTRUCTION OF THE GASTROINTESTINAL TRACT BY FOREIGN BODIES IN ADULTS. (Eng.) Coughlin, G. P.; Gallery, R.; Hamilton, D. W.; Grant, A. K. (Modbury Hosp., Modbury, South Australia 5092, Australia). *Med. J. Aust.* 2(11):367; 1977.

6942 THE CLINICAL USE OF THE NASO-GASTRIC DUODENAL MERCURY TIP SUMP TUBE IN ABDOMINAL SURGERY AND IN THE MANAGEMENT OF INTESTINAL OBSTRUCTION. (Eng.) Hodge, J. (Spartanburg General Hosp., Spartanburg, SC). *Ann. Surg.* 187(1) 100-102; 1978.

6943 INTESTINAL PNEUMATOSIS--A COMPLICATION OF THE JEJUNOILEAL BYPASS PROCEDURE. (Eng.) Clements, J. L., Jr. (Grady Memorial Hosp--Emory Univ., 80 Butler St., Atlanta, GA 30303). *Gastrointest. Radiol.* 2(3):267-271; 1977.

See also, 6740, 6755, 6756, 6761, 6793, 6835, 6844,
6851, 6869, 6873, 6880, 6887, 6889, 6947,
6948, 6966, 6978, 6990, 7037, 7092, 7199,
7206, 7219, 7220, 7222, 7224, 7232, 7241,
7242, 7243, 7244, 7254, 7255, 7256, 7258,
7259, 7260, 7263, 7266, 7269.

SMALL INTESTINE

Malabsorption

6944 RISK OF COELIAC DISEASE IN CHILDREN OF PATIENTS AND EFFECT OF HLA GENOTYPE. (Eng.) Dennis, N. R.; Stokes, C. R. (Children's Hosp., Buffalo, NY 14222). *J. Med. Genet.* 15(1): 20-22; 1978.

Seventy-three offspring of parents with celiac disease were examined to determine the risk to these children of developing the disease and to what extent this risk is affected by the histocompatibility locus antigen HLA-B. There were 40 index patients who were selected because they had at least one child over the age of 1 yr. In 27 index cases, the symptoms began before the age of 12 yr, while in 13 cases, the onset occurred between 21 and 57 yr. The childhood onset patients themselves had 51 children (aged 1-24 yr), of whom 2 had typical childhood celiac disease and 12 were classified as "suspected." Three of the latter had symptoms of celiac disease, and the other nine were selected because of low height or weight for their age. The 13 adult onset index patients had 22 children (aged 3-40 yr), of whom 1 had childhood celiac disease and 2 were classified as suspected. The parents of all four children with confirmed celiac disease were HLA-B8-positive, but one affected child did not inherit his affected parent's B8 antigen. The findings are consistent with the hypothesis that an allele affecting liability to celiac disease is in linkage disequilibrium with HLA-B8.

6945 ORGAN CULTURE OF COELIAC AND NON-COELIAC SMALL INTESTINAL MUCOSA. (Eng.) Stevens, F. M.; Keane, R.; Fottrell, P. F.; McNicholl, B.; McCarthy, C. F. (Regional Hosp. and Univ. Coll., Galway, Ireland). *Ir. J. Med. Sci.* 147(1):11-14; 1978.

Alterations of enzyme activities were investigated in intestinal biopsies from celiac and non-celiac subjects after 24 hr of maintenance in organ culture. Biopsies from 11 celiac patients and 10 non-celiac patients undergoing gastroenterological investigation were cultured for 24 hr at 37 C, then washed, wrapped in parafilm, and stored at -20 C along with washings and medium to await analysis. At 24 hr of culture, both celiac and non-celiac tissue showed morphological preservation of structure by dissecting microscope and histological examinations, although some areas of necrosis were observed. The protein content of the celiac mucosa decreased by 25-30% during culture ($p<0.02$). Statistically significant changes in enzyme activity were found as an increase in alkaline phosphatase activity (from 12.1 ± 9.5 to 20.1 ± 11.1 IU/

g protein, $p<0.02$) and a decrease in lactic de-
ydrogenase activity (from 323.9 ± 154.6 to 235.6 ±
12.7 IU/g protein) in the celiac mucosa. Activ-
ties of lactase, sucrase, leucyl β-naphthylamidase,
nd glucuronidase did not change significantly in
ither tissue.

946 FARMER'S LUNG DISEASE AND COELIAC DISEASE:
A PROSPECTIVE STUDY. (Eng.) Stevens, F.
.; Hitchcock, H. T. (Regional Hosp., Galway, Ire-
and). *Ir. J. Med. Sci.* 146(10):335-339; 1977.

o determine if the association noted between celiac
isease and diffuse pulmonary disease represents a
rue genetic relationship, a prospective study of
ine consecutive patients with farmer's lung disease
FLD) was carried out. All patients gave the typi-
al history of seasonal dyspnea and cough provoked
y exposure to moldy hay. Antibodies to *Micropoly-*
pora faeni were found in eight patients. Histo-
ompatibility locus antigen B8 was present in only
our patients. All small intestinal biopsies of
he FLD patients showed the presence of finger and
eaf villi, and none showed the convoluted or mo-
aic appearance characteristic of untreated celiac
isease. The alkaline phosphatase activity was
ignificantly higher in the FLD patients than in
ine controls ($p<0.05$). There was no significant
ifference in lactase activity or intraepithelial
ymphocytes between the patients and controls. The
esults of this preliminary investigation do not
upport the hypothesis of an association between
eliac disease and FLD.

947 PNEUMATOSIS CYSTOIDES INTESTINALIS AND
OBSTRUCTING INTUSSUSCEPTION IN CELIAC
ISEASE. (Eng.) Frank, P. H.; O'Connell, D. J.
Dept. Radiology, Univ. Chicago, 950 E. 59th St.,
hicago, IL 60637). *Gastrointest. Radiol.* 2(2):
09-111; 1977.

he case of a patient with celiac disease complica-
ed by pneumatosis cystoides intestinalis (PCI) of
he small intestine and obstructing intussusception
s presented. The patient, a 48-yr-old woman known
o have steroid-controlled celiac disease, pre-
ented with abdominal pain and distention. A chest
adiograph showed free air under the right diaphragm,
d a barium examination revealed a diffuse ab-
rmality consisting of nonpliable jejunal loops
th complete loss of the normal fold pattern and
ickening of the bowel wall. There was PCI in
everal ileal loops. The pneumoperitoneum was
ought to be secondary to the PCI. Five days later
e patient experienced acute abdominal pain; a
agnosis of an ileocolic intussusception was made
the basis of a plain abdominal radiograph and
nfirmed at laparotomy. Extensive pneumatosis
testinalis was found in the distal jejunum and
the distal 5 feet of the ileum, and the portion
the ileum containing the intramural gas was in-
lved in the intussusception. The authors believe
at the patient's documented celiac disease was
e cause of the small intestinal PCI. As polypoid
strointestinal lesions are well known for their
association with intussusception, the small intestinal gas cysts are thought to be the cause of the obstructing ileocolic intussusception.

6948 CELIAC DISEASE WITH JEJUNAL ULCERATION. (Eng.) Agrawal, R. M.; Benz, W.; Brodmerkel, G. J., Jr.; Cincala, R. P. (Allegheny General Hosp., 320 E. North Ave., Pittsburgh, PA 15212). *Am. J. Gastroenterol.* 68(3):300-303; 1977.

The case of a patient with jejunal ulceration complicating celiac disease is presented. The patient first experienced weight loss, periumbilical pain, nausea, and occasional vomiting at the age of 39. She remained essentially asymptomatic for the next 5 yr. When she again developed persistent crampy periumbilical pain, a review of an upper gastrointestinal series revealed small serrations in the duodenal walls in addition to some edematous changes in the mucosa. The lumen of the proximal jejunum appeared narrowed. These findings were confirmed by a repeat upper gastrointestinal series. Endoscopy showed esophagitis, diffuse gastritis, marked diffuse nodularity in the duodenum, and duodenitis. At this time, a biopsy showed flat mucosa with complete absence of villi. At surgery, one small ulcer was found in a resected segment of jejunum. The patient responded to a gluten-free diet, but died 18 months later; a lymph node biopsy had shown lymphosarcoma.

6949 SUCROSE MALABSORPTION IN MAN AFTER INGESTION OF α-GLUCOSIDE-HYDROLASE INHIBITOR. (Eng.) Caspary, W. F. (Dept. Medicine, Univ. Gottingen, W. Germany). *Lancet* 1(8076):1231-1233; 1978.

The effect of an α-glucosidehydrolase inhibitor (α-GHI) on intestinal sucrose absorption was assessed in seven healthy subjects by measuring rises in blood glucose and intestinal hydrogen production after the ingestion of 100 g sucrose. α-GHI (200 mg), given with the sucrose, completely inhibited early postprandial blood glucose rises, prevented late postprandial dips in blood glucose, and considerably increased breath hydrogen levels (the 30-min postprandial rise in blood glucose in each subject increased by over 30 ppm over baseline), which indicates sucrose malabsorption. Thus, the inhibitor can be used to study carbohydrate malabsorption and may be useful as a method for retarding carbohydrate absorption.

6950 DOUBLE BLIND STUDY OF MILK LACTOSE INTOLERANCE. (Eng.) Lisker, R.; Aguilar, L. (Istituto Nacional de la Nutricion, San Fernando y Viaducto, Tlalpan, Mexico 22). *Gastroenterology* 74(6):1283-1285; 1978.

A double-blind study was carried out in 150 subjects to determine the relationship between lactose malabsorption and milk lactose intolerance. Each participant received 250 ml of a different type of milk on three consecutive days. Milk A contained no lactose, milk B had 12.5 g, and milk C contained 37.5 g of lactose. After the experiment was completed, each subject was classified with a lactose tolerance test as having "sufficient" or "insufficient" lactase activity. Milk A produced no gastrointestinal symptoms in either sufficient or in insufficient persons. Milk B produced symptoms in 3.8% of sufficient and 37.1% of insufficient individuals, and milk C induced symptoms in 7.6% of sufficient and 83.5% of insufficient subjects. These differences are very highly significant ($p<0.0001$). It is concluded that lactose-intolerant subjects are indeed milk-intolerant and that the frequency with which symptoms occur in persons with lactose malabsorption increases in direct relation to the lactose content of the milk.

6951 IS JEJUNAL BIOPSY REALLY NECESSARY IN COW'S MILK PROTEIN INTOLERANCE? (Eng.) Sumithran, E.; Iyngkaran, N. (Medical Faculty, Univ. Malaya, Kuala Lumpur, Malaysia). *Lancet* 2(8048):1122-1123; 1977.

6952 FAMILY STUDIES OF LACTASE DEFICIENCY IN THE AMERICAN INDIAN. (Eng.) Newcomer, A. D.; Gordon, H.; Thomas, P. J.; McGill, D. B. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 73(5):985-988; 1977.

6953 SELECTIVE EFFECTS OF THIAZIDE ON INTESTINAL ABSORPTION OF CALCIUM ON ABSORPTIVE AND RENAL HYPERCALCIURIAS. (Eng.) Barilla, D. E.; Tolentino, R.; Kaplan, R. A.; Pak, C. Y. C. (Univ. Texas Health Science Center at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235). *Metabolism* 27(2):125-131; 1978.

6954 MULTIFACTORIAL MEGALOBLASTIC ANAEMIA. (Eng.) Hift, W.; Moshal, M. G. (Dept. Medicine, Univ. Natal, Durban, South Africa). *South Afr. Med. J.* 53(8):275-282; 1978.

6955 COELIAC DISEASE AND IMMUNOLOGICAL DISORDERS. (Eng.) Cooper, B. T.; Holmes, G. K. T.; Cooke, W. T. (General Hosp., Birmingham B4 6NH, England). *Br. Med. J.* 1(6112): 537-539; 1978.

6956 COW'S MILK INTOLERANCE PRESENTING AS NECROTIZING ENTEROCOLITIS. (Eng.) De Peyer, E.; Walker-Smith, J. (Hopital Cantonal, CH-1211 Geneve 4, Switzerland). *Helv. Paediatr. Acta* 32(6):509-515; 1977.

6957 DISACCHARIDASE DEFICIENCY IN INFANTS WITH COW'S MILK PROTEIN INTOLERANCE: RESPONSE TO TREATMENT. (Eng.) Poley, J. R.; Bhatia, M.; Welsh, J. D. (Zentrum fur Innere Medizin, Kinderheilkunde und Dermatologie, Prittwitzstrasse 43, D-7900 Ulm, W. Germany). *Digestion* 17(2):97-107; 1978.

6958 IMMUNOLOGICAL STUDIES OF EOSINOPHILIC GASTRO-ENTERITIS AND TREATMENT WITH DISODIUM CROMOGLYCATE AND BECLOMETHASONE DIPROPIONATE. (Eng.) Elkon, K. B.; Sher, R.; Seftel, H. C. (Univ. Witwatersrand Medical Sch., Hospital St., Johannesburg 2001, South Africa). *S. Afr. Med. J.* 52(21):838-841; 1977.

See also, 6796, 6934, 6978, 7229, 7235.

LARGE INTESTINE

6959 PROCTITIS AND ISCHEMIC COLITIS. (Fre.) De Witte, C.; Serste, J. P.; Dony, A. (Hopital de Schaerbeek, Boulevard Lambermont 220, 1030 Bruxelles, Belgium). *J. Belge Radiol.* 60(1): 113-116; 1977.

Two new cases of ischemic proctitis and colitis due to a vascular pathology (probably of the arterioles) near the inferior mesenteric artery are presented. The first patient (an 82-yr-old man) was admitted in cardiogenic shock with occlusive symptoms. Barium enema revealed typical lesions with "thumb print" marginal deformations of the upper descending colon. The lesions rapidly became diffuse and ulcerative, and the patient died on day 8 of a massive myocardial infarction. The second patient (an 89-yr-old woman) was seen for acute, massive rectal hemorrhage. Examination revealed ischemic lesions limited to the rectum, a rare location. The patient was treated with transfusions; the bleeding stopped and her condition improved. On day 30, rectoscopy showed a scarred, congested mucosa with a cicatricial stenosis at 10 cm of the anal margin. These ischemic lesions occur in old people or those with vascular deficiencies, although they have been reported in

women taking oral contraceptives. The radio-
ic image is characteristic: thickening of
al folds and the above thumb print deforma-
. A strict radiographic and endoscopic sur-
ance is always necessary, since the evolution
e lesions cannot be predicted by their orig-
appearance. Any increase in abdominal pain,
, or leukocytosis suggests an aggravation of
ondition and necessitates an exploratory lapa-
y.

SPONTANEOUS RESOLUTION OF COLONIC STRIC-
TURES CAUSED BY NECROTIZING ENTEROCOLITIS:
EUTIC IMPLICATIONS. (Eng.) Tonkin, I. L.
elland, J. C.; Hunter, T. B.; Capp, M. P.;
H.; Ermocilla, R. (Univ. Arizona Health Sci-
Center, Tucson, AZ 85724). *Am. J. Roentgenol.*
:1077-1081; 1978.

inical course of seven infants with colonic
ures after surviving necrotizing enterocoli-
described. Only two demonstrated the find-
fixed fibrotic stricture described in the
ture, while the remaining five showed atypical
raphic and pathologic features. Two of the
howed partial or spontaneous resolution of
crotizing enterocolitis colonic stenoses
low-up barium enema studies. In three of four
ts with colonic resections, the histopatho-
examination revealed a surprising absence of
rsible fibrosis or cicatrix formation. Cur-
urgical practice dictates elective resection
se narrowed colonic segments. The radiologic
thologic findings in this series of patients
t that surgical resection may be unnecessary
ected cases.

GIANT SIGMOID DIVERTICULUM: CLINICAL AND
RADIOLOGICAL FEATURES. (Eng.) Foster, D.
ss, B. (Royal Hosp., Sheffield, England).
(12):1051-1053; 1977.

se reports of giant sigmoid diverticulum as-
ed with diverticular disease of the sigmoid
are presented. The patients, a 61-yr-old
and an 86-yr-old man, presented with abdominal
f several weeks' duration, and the man had
bleeding. Abdominal films in the first pa-
showed a large gas-filled cyst occupying the
r part of the abdomen and containing a fluid
The lesion measured 29 cm in diameter. At
tomy, the cyst was found to be adherent an-
ly to the uterus and bladder. Barium meal
ation in the second patient showed a large
lled structure lying in the epigastrium and
cing the stomach. A barium enema examina-
owed diverticular disease of the sigmoid
with a large solitary diverticulum arising
ts superior margin. A defunctioning colos-
s carried out in the first patient and a
l colectomy with an end-to-end anastomosis
second. Pathological examination of the
ed specimens revealed communication with the
l colon in the second patient but not in the
The radiological finding of a large lucent
cystic structure related to the sigmoid colon in an elderly patient is suggestive of a giant sigmoid diverticulum. This suggestion was confirmed by barium enema examination, and the treatment of choice is surgical removal.

6962 IS THERE A MYOELECTRICAL ABNORMALITY IN THE IRRITABLE COLON SYNDROME? (Eng.)
Taylor, I.; Darby, C.; Hammond, P.; Basu, P. (Dept. Surgery, Univ. Liverpool, Liverpool, England). *Gut* 19(5):391-395; 1978.

The colonic myoelectrical pattern of 10 patients with the irritable colon syndrome and who had an abnormality of the 0.05 Hz [3 cycles/min (c/m)] slow wave electrical activity of the distal colon was compared with that in 10 patients with assorted disorders with similar symptoms (e.g., chronic pancreatitis, diverticular disease, and ulcerative colitis) to determine whether this abnormality is related to small bowel habit alone or whether it is specific to the irritable colon syndrome. Transit time, stool weights, percentage motility, and slow wave electrical activity were measured in each patient. The two groups were matched for age, and patients with similar symptoms in the two groups had similar values for transit time and percentage motility. There was a statistically significant increase in the 3 c/m electrical activity in patients with the irritable colon syndrome unrelated to the degree of diarrhea or constipation (43.9 ± 15.8% in patients with constipation and 51.1 ± 4.7% in patients with diarrhea in the irritable colon group, versus 13.2 ± 6.8% and 9.2 ± 3.7%, resp., in the patients without irritable colon). It appears that the abnormally high incidence of 3 c/m electrical activity in the colon is specific to the irritable colon syndrome and not merely a feature of altered bowel habit.

6963 INTESTINAL POLYPOSIS: A GENETIC DISEASE. (Fre.) Plauchu, H.; Bigay, D.; Casteu, J. G.; Guillemin, G.; Robert, J. M. (Service de Genetique, Hotel Dieu, F 69288 Lyon Cedex 1, France). *Lyon Med.* 239(1):21-30; 1978.

A study of 32 patients with intestinal polyposis and their 22 families confirmed that the disease is transmitted by an autosomal dominant gene with incomplete penetrance and variable expressivity. A detailed study of eight families, including complete family histories and barium enemas of all the family members, demonstrates the wide variability in the onset and course of the disease. Some family members showed symptoms at age 2, while others remained healthy until 60 yr; there is a similar wide age range at which the polyps became cancerous (age 20-65). The association of Gardner's syndrome (osteomas and epidermoid tumors) and Turcot's syndrome (nervous tissue tumors) with rectocolic polyposis in one family suggests the identical genetic transmission of all three diseases. The authors stress the need of regular checkups (especially double-contrast barium enemas) for all family members of patients with familial rectocolic polyposis. Any relatives found to have polyposis should immediately undergo a prophylactic colectomy. The conservation of the rectum will depend on whether all rectal polyps can be removed, the willingness of the patient to submit to life-long surveillance, removal of new polyps, and, of course, the presence of degenerated polpys in the rectum itself. Tracking down and examining all family members for intestinal polyposis is recommended.

6964 CARCINOMA IN SITU OF THE DISTAL PART OF THE COLON AND OF THE RECTUM. (Eng.) Rittenhouse, M. C.; Copeland, E. M., III. (M. D. Anderson Hosp. Tumor Inst., Houston, TX). *Surg. Gynecol. Obstet.* 146(2):225-229; 1978.

The cases of 103 patients with carcinoma *in situ* of the rectum, rectosigmoid, and sigmoid colon diagnosed between 1944 and 1974 were evaluated retrospectively. In 42 patients, carcinoma *in situ* was unassociated with other malignant disease or medical illness; 43 had synchronous invasive carcinoma of the colon; 7 had a history of invasive carcinoma of the colon; and 9 had an associated cancer not involving the colon. The majority of lesions occurred within an adenomatous polyp. Among the 42 patients with carcinoma *in situ* alone, one-third were asymptomatic, 18 had bleeding, and 5 each had a change in intestinal habits or abdominal pain. The diagnosis was made by sigmoidoscopy in 34 patients, by operation in 7, and by colonoscopy in 1. Adequate excision, either locally or by colonic resection, was all that was required in these patients; however, two developed metachronus carcinoma of the colon and one later had a solitary metastasis to the liver, indicating that these patients should be observed indefinitely by frequent barium enemas and sigmoidoscopy. Of the 43 patients with carcinoma *in situ* and synchronous invasive colon carcinoma, only 12% were asymptomatic, and 38% had more than one symptom. Carcinoma *in situ* was diagnosed either by sigmoidoscopic biopsy (58%) or by examination of the resected surgical specimen (42%). Prognosis and treatment were determined by the nature of the invasive lesion, and colonic resection was performed in 85% of these patients. At the most recent follow-up, 11 were alive without evidence of disease, 1 was alive with metastasis, 11 were dead of other causes, and 20 were dead of metastatic carcinoma of the colon (only 3 of these survived for ≥5 yr after treatment). Of the seven patients with a history of carcinoma, the time elapsing between treatment of the prior carcinoma and the diagnosis of carcinoma *in situ* was <3 yr in four patients and <10 yr in all patients. All seven survived at least 5 yr and two developed a third carcinoma of the colon. In the nine patients with other carcinomas (lung in 3; breast, nasopharynx, cervix, and kidney in 1 each; stomach in 2), the invasive malignant disease determined the prognosis, and all were dead within 5 yr of the diagnosis of carcinoma *in situ* of the colon.

6965 LEIOMYOSARCOMA OF THE ANUS: REPORT OF A CASE. (Eng.) Wolfson, P.; Oh, C. (Mount Sinai Sch. Medicine, City Univ. New York, Fifth Ave. at 100th St., New York, NY 10029). *Dis. Colon Rectum* 20(7):600-602; 1977.

6966 THE VALUE OF GASTROGRAFIN IN THE DIFFERENTIAL DIAGNOSIS OF PARALYTIC ILEUS VERSUS MECHANICAL INTESTINAL OBSTRUCTION: A CRITICAL REVIEW AND REPORT OF TWO CASES. (Eng.) Zer, M.; Kaznelson, D.; Feigenberg, Z.; Dintsman, M. (Beilinson Hosp., Petah Tiqva, Israel). *Dis. Colon Rectum* 20(7):573-579; 1977.

6967 THE STUDY OF ANORECTAL DISEASE BY COLPOSCOPY. (Eng.) O'Connor, J. J. (Columbi Hosp. Women, Washington, DC). *Dis. Colon Rectum* 20 (7):570-572; 1977.

6968 ULCERATIVE PROCTITIS WITH STRICTURE TREATED WITH HYDROCORTISONE INJECTIONS: REPORT OF A CASE. (Eng.) Nelson, R. S. (Univ. Texas System Cancer Center, Houston, TX 77030). *Dis. Colon Rectum* 20(6):515-516; 1977.

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6970 MALIGNANT APPENDICEAL CARCINOID WITH INTUSSUSCEPTION OF THE BASE MANIFESTING AS A CECAL TUMOR: REPORT OF A CASE. (Eng.) Skaane, P.; Eide, T. J. (Harstad Sykehus, 9400 Harstad, Norway). *Dis. Colon Rectum* 20(6):511-514; 1977.

6971 STERCORACEOUS ULCERATIONS AND PERFORATION OF THE COLON: REPORT OF CASES AND SURVEY OF THE LITERATURE. (Eng.) Shatila, A. H.; Ackerman, N. B. (Cleveland Metropolitan General Hosp., Case Western Reserve Univ., Cleveland, OH). *Dis. Colon Rectum* 20(6):524-527; 1977.

6972 CARDIAC DISEASE AND RECURRENT GASTROINTESTINAL BLEEDING: ANGIODYSPLASIA WITH ACCOMPANYING HYPERTROPHIC SUBAORTIC STENOSIS. (Eng Kimmel, D. J.; Paster, S. B.; Burstein, J.; Stovrin J.; Cochran, P. T. (Bernalillo County Medical Cente Albuquerque, NM). *Rocky Mt. Med. J.* 74(6):316-318; 1977.

6973 FAMILIAL VARICES OF THE COLON DIAGNOSED B COLONOSCOPY. (Eng.) Solis-Herruzo, J. A (Ciudad Sanitaria "1° de Octubre," Carretera de Andalucia Km. 5.400, Madrid, 26, Spain). *Gastrointest. Endosc.* 24(2):85-86; 1977.

6974 MANITOBA BARIUM ENEMA EFFICACY STUDY. (Eng.) MacEwan, D. W.; Kavanagh, S.;

Chow, P.; Tishler, J. M. (Health Sciences Center, 700 William Ave., Winnipeg, Manitoba R3E 0Z3, Canada). *Radiology* 126(1):39-44; 1978.

5975 A NEW TECHNIQUE FOR RESECTING THE NON-INFLAMED NOT-ADHESIVE APPENDIX THROUGH A MINI-LAPAROTOMY WITH THE AID OF THE LAPAROSCOPE. (Eng.) De Kok, H. J. M. (Streekziekenhuis Prinses Beatrix, Gorinchem, Netherlands). *Arch. Chir. Neerl.* 29(3):195-198; 1977.

5976 MEGACYSTIS-MICROCOLON-INTESTINAL HYPOPERISTALSIS SYNDROME: A CAUSE OF INTESTINAL OBSTRUCTION IN THE NEWBORN PERIOD. (Eng.) Amoury, R. A.; Fellows, R. A.; Goodwin, C. D.; Hall, R. T.; Holder, T. M.; Ashcraft, K. W. (Children's Mercy Hosp., 24th and Gillham Rd., Kansas City, MO 64108). *J. Pediatr. Surg.* 12(6): 1063-1065; 1977.

5977 SYNCHRONOUS PRIMARY ADENOCARCINOMAS OF THE COLON AND RECTUM. (Eng.) Lasser, . (Hosp. St. Raphael, New Haven, CT). *Dis. Colon Rectum* 21(1):20-22; 1978.

978 OPERATIONS FOR INFLAMMATORY BOWEL DISEASE. (Eng.) Block, G. E.; Giuliano, A. E. Univ. Chicago Pritzker Sch. Medicine, 950 E. ifty-Ninth St., Chicago, IL 60637). *Surg. Clin. orth Am.* 57(6):1235-1251; 1977.

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980 COLOSTOMY AND COLOSTOMY CLOSURE. (Eng.) Hines, J. R.; Harris, G. D. (Northwestern niv. Medical Sch., 303 E. Chicago Ave., Chicago, L 60611). *Surg. Clin. North Am.* 57(6):1379-1392; 977.

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982 COMPLICATIONS OF COLONOSCOPY. (Eng.) Marino, A. W. M., Jr. (One Hanson Place, rooklyn, NY 11243). *Dis. Colon Rectum* 21(1):15-16; 978.

983 MANAGEMENT OF PATIENTS WHO HAVE POLYPS CONTAINING INVASIVE CARCINOMA REMOVED IA COLONOSCOPE. (Eng.) Nivatvongs, S.; Goldberg, M. (Box 450, Univ. Hosp., Minneapolis, MN 55455). *s. Colon Rectum* 21(1):8-11; 1978.

6984 DETECTION OF OCCULT BLOOD IN FAECES [Letter to Editor]. (Eng.) Garrick, D. P.; Close, J. R.; McMurray, W. (Wythenshawe Hosp., Manchester M23 9LT, England). *Lancet* 2(8042):820-821; 1977.

6985 PREPARATION OF THE LARGE BOWEL FOR ENDOSCOPY. (Eng.) Teague, R. H.; Manning, A. P. (Royal Infirmary, Bristol, England). *J. Int. Med. Res.* 5(5):374-377; 1977.

6986 INVERSION OF THE APPENDIX. (Eng.) Tomkinson, J. (Guy's Hosp. Medical Sch., London S.E.1, England). *Acta Obstet. Gynecol. Scand.* 56(4):431-433; 1977.

6987 SIGMOIDOVAGINAL FISTULAE DUE TO DIVERTICULAR DISEASE: TWO CASE REPORTS AND AN UPDATE. (Eng.) Walton, L.; Schwartz, M.; Photopulos, G.; Fowler, W., Jr. (Univ. North Carolina Sch. Medicine, Chapel Hill, NC 27514). *Obstet. Gynecol.* 51(1, Suppl.):59S-61S; 1978.

6988 ANAL AGENESIS WITH RECTOBULBAR FISTULA. (Eng.) Currarino, G.; Votteler, T. P.; Kirks, D. R. (Children's Medical Center, 1935 Amelia St., Dallas, TX 75235). *Radiology* 126(2): 457-461; 1978.

6989 RECTAL BLEEDING SECONDARY TO FECAL DISIMPACTION: ANGIOGRAPHIC DIAGNOSIS AND TREATMENT. (Eng.) Naderi, M. J.; Bookstein, J. J. (Kern Medical Center, 1830 Flower St., Bakersfield, CA 93305). *Radiology* 126(2):387-389; 1978.

6990 RARE TUMORS OF THE INTESTINES AND RECTUM. (Eng.) Ibrahim, K. A. (Ras El-Tin General Hosp., Alexandria, Egypt). *Int. Surg.* 62(11/12):611-615; 1977.

6991 HIRSCHSPRUNG: THE MAN AND THE DISEASE. (Eng.) Lister, J. (Alder Hey Children's Hosp., Liverpool, England). *J. R. Coll. Surg. Edinb.* 22(6):377-384; 1977.

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6995 PATHOLOGICAL CHANGES IN THE APPENDIX: A REVIEW OF 1000 CASES. (Eng.) Dymock, R. B. (Queen Elizabeth Hosp., Woodville, South Australia 5011, Australia). *Pathology* 9(4):331-339; 1977.

6996 MULTIPLE CARCINOMAS OF THE LARGE BOWEL: A NATURAL EXPERIMENT IN ETIOLOGY AND PATHOGENESIS. (Eng.) Enker, W. E.; Dragacevic, S. (American Cancer Society, Chicago, IL). *Proc. Inst. Med. Chic.* 31(6):178-179; 1977.

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6998 THE SIGNIFICANCE OF VILLOUS COMPONENT IN COLONIC POLYPS. (Eng.) Appel, M. F.; Spjut, H. J.; Estrada, R. G. (Kelsey-Seybold Clinic, Houston, TX). *Am. J. Surg.* 134(12):770-771; 1977.

6999 RECTAL AND COLONIC POLYP RELATIONSHIPS VIA COLONOSCOPY AND FIBERSIGMOIDOSCOPY. (Eng.) Theuerkauf, F. J., Jr. (Saint Vincent Health Center, 232 W. 25th St., Erie, PA 16512). *Dis. Colon Rectum* 21(1):2-7; 1978.

7000 INVASION PROFILE OF COLORECTAL CARCINOMA. (Eng.) Montessori, G. A.; Donald, J. C. (Royal Jubilee Hosp., 1900 Fort St., Victoria, British Columbia V8R 1J8, Canada). *Dis. Colon Rectum* 21(1):26-28; 1978.

7001 CONTINENT COLOSTOMY WITH THE AID OF A MAGNETIC CLOSING SYSTEM: A PRELIMINARY REPORT. (Eng.) Kewenter, J. (Sahlgren's Hosp., S-413 45 Goteborg, Sweden). *Dis. Colon Rectum* 21(1):46-51; 1978.

7002 ENDOMETRIOID CARCINOMA OF THE RECTUM ARISING IN ENDOMETRIOSIS: REPORT OF A CASE. (Eng.) Lott, J. V.; Rubin, R. J.; Salvati, E. P.; Salazar, G. H. (704 Route 202 South, Bridgewater, NJ 08807). *Dis. Colon Rectum* 21(1):56-60; 1978.

7003 RESPIRATORY FAILURE IN ADULT HIRSCHSPRUNG'S DISEASE: REPORT OF A CASE. (Eng.) Munro, A. (Woodend General Hosp., Univ. Medical Buildings, Foresthill, Aberdeen, AB9 2ZD, Scotland). *Dis. Colon Rectum* 21(1):52-53; 1978.

7004 PNEUMATOSIS COLI: REPORT OF TWO CASES. (Eng.) Goodall, R. J. R. (Hope Hosp., Eccles Old Rd., Salford M6 8HD, England). *Dis. Colon Rectum* 21(1):61-65; 1978.

7005 IRRADIATION-INDUCED COLONIC STRICTURE AND COLITIS CYSTICA PROFUNDA: REPORT OF A CASE. (Eng.) Baratz, M.; Werbin, N.; Wiznitzer, T.; Rozen, P. (Ichilov Hosp., Tel-Aviv, Israel). *Dis. Colon Rectum* 21(1):75-79; 1978.

7006 THE USE OF LOPERAMIDE TO REGULATE PERISTALSIS AND IMPROVE BOWEL CONTROL: A PRELIMINARY REPORT. (Eng.) Nixon, H. H. (Hosp. Sick Children, Great Ormond St., London, England). *J. Pediatr. Surg.* 13(1):87-88; 1978.

7007 ANAL STRICTURE FOLLOWING Pseudomonas SEPSIS. (Eng.) Greco, R. S. (Coll. Medicine and Dentistry-Rutgers Medical Sch., Piscataway, NJ). *J. Pediatr. Surg.* 13(1):91-92; 1978.

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TIC PREOPERATIVE ANTIBIOTICS IN THE REDUC
TION OF SEPTIC MORBIDITY. (Eng.) Fine, M.; Busuttil, R. W. (Univ. California at Los Angeles Sch. Medicine, Los Angeles, CA 90024). *Am. J. Surg.* 135(2):210-212; 1978.

7009 RELATIONSHIP BETWEEN POSTOPERATIVE TEMPER
TURE AND SURVIVAL IN PATIENTS RESECTED FO
COLORECTAL CANCER. (Eng.) Hafstrom, L.; Holmin, T. (Dept. Surgery, Univ. Lund, S-221 85 Lund, Sweden). *Am. J. Surg.* 135(2):213-214; 1978.

7010 SIGMOID VOLVULUS IN THE YOUNG: A CASE FOLLOWING CESAREAN SECTION. (Eng.) Fuller, J. K.; Larrieu, A. J. (Univ. Texas Medical Branch, Galveston, TX 77550). *Arch. Surg.* 113(3):316-317; 1978.

7011 MYOTONIC MEGACOLON IN MYOTONIC DYSTROPHY (Eng.) Weiner, M. J. (St. Paul-Ramsey Hosp. and Medical Center, St. Paul, MN 55101). *Am. J. Roentgenol.* 130(1):177-179; 1978.

7012 TRANSVERSE COLON IN ADULT UMBILICAL HERNIA. (Eng.) Forrest, J. V.; Stanley R. J. (Dept. Radiology, Univ. California, 3350 La Jolla Village Drive, San Diego, CA 92161). *Am. J. Roentgenol.* 130(1):57-59; 1978.

7013 DIAGNOSIS AND TREATMENT OF INTRA-ABDOMIN
ABSCESSES AFTER APPENDECTOMY. (Rus.)

Guzeev, A. I. (Novgorod Municipal Hosp., Novgorod, USSR). *Vestn. Khir.* 120(2):50-53; 1978.

7014 LONG-TERM RESULTS OF SURGICAL TREATMENT OF ACUTE COMMISSURAL ILEUS. (Rus.) Toropov, Iu. D. (Zaporozhe Inst. Advanced Training Physicians, Zaporozhe, USSR). *Khirurgiia (Mosk.)* (3):55-59; 1978.

7015 EARLY COMMISSURAL ILEUS AFTER APPENDECTOMY. (Rus.) Kovalev, M. M.; Roi, V. P.; Burka, A. A.; Babenkov, G. D.; Gunchenko, A. N. (Surgical Clinic, Kiev Medical Inst., Kiev, USSR). *Khirurgiia (Mosk.)* (3):59-63; 1978.

7016 THE CAUSES OF ACUTE COMMISSURAL ILEUS. (Rus.) Udod, V. M.; Grinberg, S. B.; Kotiger, Ya. S.; Andrun, P. K. (General Surgery Clinic, Tselinograd Medical Inst., Tselinograd, USSR). *Khirurgiia (Mosk.)* (3):63-66; 1978.

See also, 6739, 6761, 6764, 6771, 6776, 6783, 6793, 6802, 6858, 6886, 6932, 6938, 6940, 7018, 7020, 7027, 7220, 7222, 7223, 7232, 7241, 7242, 7243, 7244, 7254, 7255, 7256, 7257, 7258, 7259, 7260, 7268.

LARGE INTESTINE

Ulcerative Colitis

7017 MENTAL DISORDERS IN ULCERATIVE COLITIS: SUICIDE, DIVORCE, PSYCHOSIS, HOSPITALIZATION FOR MENTAL DISEASE, ALCOHOLISM, AND CONSUMPTION OF PSYCHOTROPIC DRUGS IN 178 PATIENTS SUBJECTED TO COLECTOMY. (Eng.) Gruner, O. P. N.; Naas, R.; Gjone, E.; Flatmark, A.; Fretheim, B. (Rikshospitalet, Oslo 1, Norway). *Dis. Colon Rectum* 21(1):37-39; 1978.

The incidence of mental disorders, divorce, alcoholism, and consumption of psychotropic drugs in 178 patients who underwent colectomy for the treatment of ulcerative colitis was compared with that in the general Norwegian population. The frequencies of suicide, divorce, psychosis, hospitalization for mental disorders, and consumption of psychotropic drugs did not differ significantly from corresponding frequencies in the general population.

7018 CLINICAL OUTCOME OF THE FIRST TEN YEARS OF ULCERATIVE COLITIS AND PROCTITIS. (Eng.) Ritchie, J. K.; Powell-Tuck, J.; Lennard-Jones, J. E. (St. Mark's Hosp., City Rd., London EC1V 2PS, England). *Lancet* 1(8074):1140-1143; 1978.

Two hundred sixty-nine patients with ulcerative colitis and a history of less than 6 months when first seen at St. Mark's Hospital in the decade 1966-75 were followed for up to 11 yr in a study of the mortality and prognosis of this disease. The outcome was correlated with the maximum extent of the disease observed within 3 months of presentation. Seventy-five patients required hospital admission, 56 within 1 yr of presentation. Extensive colitis developed in 60 patients. The cumulative probability of the disease being extensive was 21 ± 3% at 5 yr and 29 ± 4% at 10 yr. Twenty-five patients required surgical treatment. The cumulative probability of operation was 8 ± 2% at 5 yr and 15 ± 4% at 10 yr. Nineteen patients are known to have died. The expected number of deaths was 19.2.

7019 STROKES AND ULCERATIVE COLITIS. (Eng.) Mayeux, R.; Fahn, S. (Presbyterian Hosp., New York, NY). *Neurology* 28(6):571-574; 1978.

The cases of three young patients who had ulcerative colitis and cerebral thrombosis are presented. The first two patients, a 12-yr-old boy and a 17-yr-old girl, experienced more than one episode of thromboembolic disease. The boy first developed left focal motor seizures during treatment for an exacerbation of colitis. The seizures were controlled with anticonvulsants, but a dense left hemiparesis persisted. This condition slowly improved, but he had two subsequent episodes of thrombophlebitis of the right leg. The girl developed a sudden loss of vision in the left eye during treatment for an exacerbation of colitis. The optic disk was pale, and there were small hemorrhages in the periphery, compatible with central retinal artery occlusion. She developed left focal motor seizures, left homonymous hemianopia, and left hemiparesis. Except for nonspecific arthralgia and atopic eczema in this patient, neither of the patients had evidence of any other extracolonic manifestation of ulcerative colitis. Clinical and laboratory data indicated arterial occlusion in these two cases. The third case was a 26-yr-old woman who developed right focal motor seizures 50 hr after undergoing a total proctocolectomy. Following the seizures, there was fluent aphasia and right hemiparesis. All patients survived, and the neurologic symptoms gradually improved. Systemic arterial and venous thromboembolic complications occur often in ulcerative colitis, but stroke is uncommon. Abnormalities in the early stages of clotting may be responsible, and the risk of thromboembolic phenomena in young patients seems to increase with exacerbations of this form of chronic inflammatory bowel disease.

7020 PREDICTION OF MALIGNANCY IN ULCERATIVE COLITIS [Abstract]. (Eng.) Nugent, F. W.; Haggitt, R. C.; Colcher, H.; Kutteruf, G. C. (Lahey Clinic Foundation, Boston, MA). *Gastroenterology* 72(5, Part 2):1108; 1977.

7021 ASSESSMENT OF SACRO-ILIITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE (IBD) [Abstract]. (Eng.) Davis, P.; Thomson, A. B. R. (Univ. Alberta, Edmonton, Alberta, Canada). *Gastroenterology* 72(5, Part 2):1045; 1977.

7022 THE SPECTRUM OF ANKYLOSING SPONDYLITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE--CLINICAL AND GENETIC STUDIES [Abstract]. (Eng.) Dekker-Saeys, B. J.; Meuwissen, S. G. M.; van den Berg-Loonen, E. M.; Tytgat, G. N. J. (Amsterdam Center Rheumatic Diseases, Univ. Amsterdam, Amsterdam, Netherlands). *Gastroenterology* 72(5, Part 2): 1047; 1977.

7023 EXPERIMENT TO DETERMINE THE ACTIVE THERAPEUTIC MOIETY OF SULPHASALAZINE [Abstract]. (Eng.) Khan, A. K. A.; Piris, J.; Truelove, S. C. (Radcliffe Infirmary, Oxford, England). *Gut* 18(11): A971; 1977.

7024 DIAGNOSIS AND THERAPY OF ZINC DEFICIENCY DURING TOTAL PARENTERAL FEEDING. A REVIEW AND CASE REPORT. (Ger.) Weismann, K.; Wanscher, B.; Knudsen, L. (Rigshospital, Dermatologische Abteilung, Blegdamsvej 9, DK-2100 Copenhagen, Denmark). *Hautarzt* 28(11):578-582; 1977.

7025 LIVER INVOLVEMENT IN INFLAMMATORY BOWEL DISEASE. (Eng.) Bayless, T. M.; Boitnott, J. K. (Johns Hopkins Univ. Medical Sch., Baltimore, MD). *Johns Hopkins Med. J.* 141(4):226-232; 1977.

7026 SULPHASALAZINE-INDUCED LUPUS SYNDROME IN ULCERATIVE COLITIS. (Eng.) Griffiths, I. D.; Kane, S. P. (Charing Cross Hosp., London W6, England). *Br. Med. J.* 2(6096):1188-1189; 1977.

7027 SURGICAL ASPECTS OF ULCERATIVE COLITIS AND CROHN'S DISEASE OF THE LARGE BOWEL. (Eng.) Goligher, J. C. (General Infirmary, Leeds, England). *Adv. Surg.* 11:71-99; 1977.

7028 CURRENT STATUS OF THE PRECANCER LESION IN ULCERATIVE COLITIS. (Eng.) Dobbins, W. O., III (George Washington Univ. Medical Center, H. B. Burns Memorial Building, 2150 Pennsylvania Ave., N.W., Washington, DC 20037). *Gastroenterology* 73(6):1431-1433; 1977.

See also, 6978, 6979, 7262.

PANCREAS

7029 EFFECT OF SALIVA FROM CYSTIC FIBROSIS PATIENTS AND FROM NORMAL SUBJECTS ON RED BLOOD CELL SODIUM TRANSPORT. (Eng.) Grinwald, P. M.; Segal, M. B. (St. Thomas' Hosp. Medical Sch., Lambeth Palace Rd., London, SE1 7EH, England). *Pediatr. Res.* 12(1):1-3; 1978.

To determine whether saliva contains substances that may be relevant to the transport abnormality in cystic fibrosis, the effect of saliva from cystic fibrosis patients on RBC sodium transport was compared with that from normal subjects. RBC from cystic fibrosis patients exhibited a significantly decreased ($p<0.01$) ouabain-insensitive fraction of Na^+ efflux compared with normal controls. Saliva taken from both the patients and the normal subjects caused an increase in Na^+ efflux from normal RBC, either in presence or absence of ouabain (0.1 mM), of 19% to 29% as compared with untreated control RBC. There was no significant difference between the effects of cystic fibrosis saliva and normal saliva. The model in this study has not confirmed that a modification of the cell membrane by uncharacterized circulating or secreted factors may be involved in the transport abnormality in cystic fibrosis.

7030 PANCREATIC PSEUDOCYSTS: UNUSUAL ULTRASOUND FEATURES. (Eng.) Conrad, M. R.; Landay, M. J.; Khoury, M. (Parkland Memorial Hosp., 5201 Harry Hines Blvd., Dallas, TX 75235). *Am. J. Roentgenol.* 130(2):265-268; 1978.

Three cases of pancreatic pseudocyst having unusual findings on the sonogram are presented. All patients were alcoholics. In one patient, the renal parenchyma was markedly compressed between the anterior and posterior components of the perinephric pseudocyst so that an intrinsic renal mass was mimicked on the excretory urogram. The correct diagnosis was made by the determination of the amylase in the aspirated fluid. In the second case, sonography revealed a large cystic mass in the left upper quadrant contiguous with and displacing the spleen medially. The lateral location of the cystic mass and the lack of a continuous distinct interface between the cystic mass and the spleen resulted in confusion with a splenic subcapsular hematoma. The large necrotic pseudocyst was discovered at surgery. The phlegmenous inflammatory reaction associated with it probably was responsible for obscuring the interface between the pseudocyst and the spleen. In the third patient, the sonographic findings were indistinguishable from those seen in a perinephric abscess. However, the patient's good renal function and a well-defined renal margin on the excretory urogram suggested that this diagnosis was unlikely. The elevated amylase in the purulent aspirated fluid established a definitive diagnosis of an infected dissecting pseudocyst, of which only the small posterior perinephric portion was appreciated on the sonogram. Pancreatic pseudocysts must be considered in all patients with a history of chronic alcoholism who have evidence of an abnormal cystic collection by sonography.

7031 LABORATORY DIAGNOSIS OF CHRONIC PANCREATIC DISEASES. (Ita.) Robba, L.; Levoni, P. (Ospedali Riuniti di Bergamo, Bergamo, Italy). *Minerva Med.* 68(30):2077-2084; 1977.

7032 EXPERIENCE WITH THE USE OF BILE DUCT PROSTHESIS. (Ger.) Hartenbach, W. (Stadtische Chirurgische Klinik, Schwalbacher Strasse 62, D-6200 Wiesbaden, W. Germany). *Chirurg* 48(8):549-552; 1977.

7033 PRACTICAL APPLICATION OF EXTERNAL DRAINAGE OF THE PANCREATIC DUCT. (Rus.) Napalkov, P. N.; Artem'eva, N. N. (Surgical Clinic, Leningrad Inst. Hygiene and Medicine, Leningrad, USSR). *Vestn. Khir.* 118(2):3-8; 1977.

7034 SEPTIC COMPLICATIONS IN PANCREATIC SURGERY. (Ger.) Neher, M.; Mangold, G.; Ruckert, K.; Kummerle, F. (Chirurgische Universitatsklinik, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Therapiewoche* 27(47):8467-8475, *passim;* 1977.

7035 LESION OF THE TAIL OF THE PANCREAS IN CONGENITAL APLASIA OF THE LEFT CUPULA OF THE DIAPHRAGM. (Rus.) Kriviakin, K. D.; Zhdanov, A. I. (Volokolamsk Central Regional Hosp., Volokolamsk, Moscow Oblast, USSR). *Khirurgiia (Mosk.)* (1):115-116; 1978.

7036 COMPARISON OF PANCREATIC CARCINOMA WITH CHRONIC PANCREATITIS BY SERUM GLYCOPROTEIN. (Jpn.) Noda, T.; Ishii, K.; Tsuchiya, R.; Ito, T.; Kondo, N.; Saheki, S. (Nagasaki Univ. Sch. Medicine, Nagasaki, Japan). *Jpn. J. Cancer Clin.* 23(8):831-835, A-42; 1977.

7037 LATE METASTASIS OF HYPERNEPHROMA TO THE PANCREAS WITH TUMOR INVASION OF THE DUODENUM. (Ger.) Hermanutz, K. D.; Sonnenberg, G. E. (Radiologische Klinik, Universitat Bonn, Wilhelmstrasse 35-37, 5300 Bonn, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(6):595-597; 1977.

See also, 6749, 6766, 6772, 6773, 6774, 6775, 6776, 6777, 6784, 6785, 6794, 6796, 6797, 6798, 6801, 6804, 6807, 6942, 7039, 7058, 7064, 7168, 7175, 7176, 7205, 7217, 7224.

PANCREAS

Pancreatitis

7038 ELEVATED SERUM ALKALINE PHOSPHATASE LEVEL MAY AID IN THE DIAGNOSIS OF PANCREATITIS. (Eng.) Hislop, I. G.; Ryan, G. P. (Fremantle Hosp., Adelaide, Australia). *Med. J. Aust.* 2(7):209-211; 1977.

The occurrence of an elevated serum alkaline phosphatase (SAP) level in some patients with pancreatitis was studied in 10 patients. Seven patients had alcoholic pancreatitis, whereas the remaining three drank little or no alcohol. The SAP levels were intermittently and variably raised. There was usually a close relationship between pain and a rise in the SAP levels, but other laboratory investigations often failed to support a diagnosis of pancreatitis, the serum and urinary amylase levels being normal or minimally raised. However, when the SAP level exceeded twice normal values, serum or urinary amylase values generally indicated a clinical diagnosis of pancreatitis. To exclude coexisting hepatic disease, liver function was assessed in all cases. The bilirubin levels were normal in all cases, and the aspartate transaminase levels were only mildly elevated in two patients (148 U and 111 U, resp.). SAP estimation may assist in establishing a clinical diagnosis in cases of abdominal pain in which pancreatitis is suspected.

7039 THE CEA CONCENTRATION IN DUODENAL FLUID IN PATIENTS WITH PANCREATIC DISEASE.

(Eng.) Rolny, P.; Elwing, H.; Nilsson, L. A. (Dept. Surgery III, Univ. Goteborg, Goteborg, Sweden). *Scand. J. Gastroenterol.* 12(6):759-763; 1977.

Six patients with pancreatic carcinoma, 10 patients with chronic alcoholic pancreatitis, 10 patients with other upper abdominal nonpancreatic diseases, and 10 healthy volunteers were studied to establish whether carcinoembryonic antigen (CEA) determination in duodenal fluid obtained during the secretin-cholecystokinin (CCK) test can give additional information for the diagnosis of pancreatic disease and for differentiation between inflammatory and malignant pancreatic disease. The CEA concentration in the duodenal fluid after secretin-CCK stimulation in healthy volunteers ranged from 2.5 ng/ml to 25 ng/ml. Four of the patients with pancreatic carcinoma had a concentration that was equal to or exceeded 25 ng/ml, and three had concentrations greater than 50 ng/ml. The levels were higher than 25 ng/ml in all 10 patients with chronic pancreatitis, and the level was over 50 ng/ml in 6 of them. All but one of these patients had abnormal pancreatic secretion. A CEA concentration greater than 50 ng/ml occurred in 3 of the 10 patients with other abdominal diseases. It is concluded that a high CEA concentration in duodenal fluid after secretin-CCK stimulation does not necessarily indicate pancreatic carcinoma. The level may also be elevated in nonpancreatic diseases.

7040 ACUTE PANCREATITIS FOLLOWING RENAL ALLOTRANSPLANTATION: A LETHAL COMPLICATION.

(Eng.) Taft, P. M.; Jones, A. C.; Collins, G. M.; Halasz, N. A. (Univ. California Medical Center, San Diego, 225 W. Dickinson St., San Diego, CA 92103). *Am. J. Dig. Dis.* 23(6):541-544; 1978.

The cases of six patients who developed acute pancreatitis following renal allotransplantation are presented. The first patient, a 29-yr-old man, was thought to have developed pancreatitis as a result of the immunosuppressive regimen, which included azathioprine (75 mg, q.i.d.). He has had no relapse after this drug was stopped. He did have a history of recurrent abdominal pain since the age of 16, but there was no proof that it was related in any way to his subsequent pancreatitis. In the second patient, a strong alcoholic history, the immunosuppressive drugs, and a penetrating posterior peptic ulcer could have been involved in the development of fatal pancreatitis. Pancreatitis in the third patient was related to secondary or tertiary hyperparathyroidism. Cessation of immunosuppressive therapy and the intentional sacrifice of the renal graft in an attempt to reverse the progressive sepsis in this patient failed, resulting in his death. In the fourth patient, the insidious nature of post-transplantation pancreatitis was well illustrated. There was no prodrome and no suggestive symptomatology, until the patient presented with a full-blown surgical abdomen. The patient was found to have cholelithiasis, but since the pancreatitis involved only the distal pancreas, it was doubtful that this condition was etiologic. The patient died after he developed a high jejunal fistula with continuing sepsis and progressive pulmonary insufficiency. The fifth patient developed pancreatitis during the second week of treatment for allograft rejection. His initial presentation for rejection may have actually been the early stage of pancreatitis. His alcohol abuse may have set the stage of susceptibility to other agents, such as his immunosuppression, which resulted in clinical pancreatitis. The last patient presented with progressive adult respiratory distress syndrome for which no etiologic agent could be identified. At autopsy, he was found to have acute pancreatitis and no primary pulmonary infection as the cause of death.

7041 CHOLEDOCHOCELE DEMONSTRATED ON PERCUTANEOUS CHOLANGIOGRAPHY: A PATIENT WITH ACUTE FULMINANT PANCREATITIS.

(Eng.) Jones, B. (Harvard Medical Sch., 25 Shattuck St., Boston, MA 02115). *Gastrointest. Radiol.* 2(2):145-147; 1977.

The case of a patient in whom a choledochocele, demonstrated by percutaneous cholangiography, was associated with the development of acute fulminant pancreatitis is presented. The patient, a 37-yr-old woman, had previously undergone a bilateral nephrectomy for progressive renal failure due to scleroderma. She developed severe upper abdominal pain that remained unexplained for 4 yr after her initial presentation. A number of gastrointestinal series and an oral cholecystogram had been negative. At the last hospital admission, acute pancreatitis was the clinical diagnosis. This condition apparently deteriorated into hemorrhagic pancreatitis, almost certainly aggravated by her anticoagulant therapy, which she had received since the time of the nephrectomy. The anticoagulant therapy was stopped, and cholangiography was performed. The well-developed class III choledochocele was demonstrated by this procedure. It was decided to postpone surgery until her condition had stabilized, but despite improving liver function tests and decreasing amylase, the patient died 1 week after the diagnosis was made. The altered pressure dynamics and compromised drainage of the biliary and pancreatic ducts by their insertion into the choledochocele was the probable mechanism for the development of obstructive jaundice and acute pancreatitis. Because this rare lesion is potentially curable with surgery, its identification by percutaneous or i.v. cholangiography has important clinical significance.

)42 A SINGLE-CENTRE DOUBLE-BLIND TRIAL OF TRASYLOL THERAPY IN PRIMARY ACUTE PANCREA-

ITIS. (Eng.) Imrie, C. W.; Benjamin, I. S.;
erguson, J. C.; McKay, A. J.; Mackenzie, I.; O'Neill,
.; Blumgart, L. H. (Royal Infirmary, Glasgow, Scot-
and). *Br. J. Surg.* 65(5):337-341; 1978.

double-blind trial of i.v. aprotinin (Trasylol)
erapy as a supplement to a standard regimen of
nservative management was carried out in 161 pa-
ents with primary acute pancreatitis. The pa-
ents were subdivided into younger (<60 yr) and
der patients (≥60 yr), and subjects in each group
re randomly allocated either to Trasylol therapy
tarter 500,000 KIU and thereafter 200,000 q.i.d.
r 5 days) or to placebo. There were 14 deaths
.7%), 7 in the Trasylol and 7 in the pla-
bo group, and no significant difference was found
either the mortality or the major complications
te, either overall or within either age group.
l 14 patients who died met the objective criteria
r severe acute pancreatitis determined by the
esence of at least three of a possible nine fac-
rs during the first 48 hr of admission. Severe
ute pancreatitis was present in 37% of patients,
o were evenly distributed between the Trasylol and
acebo groups. Neither in those patients with
vere nor in those with less severe acute pancre-
itis was there any significant difference between
e two therapeutic regimens. Supplementary Trasylol
erapy at this dosage confers no advantage over
andard conservative treatment in the management
patients with primary acute pancreatitis.

43 SPECIFICITY OF INCREASED AMYLASE TO CREATININE CLEARANCE RATIO IN ACUTE PANCREATI-

S. (Eng.) Lankisch, P. G.; Koop, H.; Otto, J.;
erdieck, U.; Winckler, K.; Wolfrum, D. I. (Medi-
nische Universitats Klinik, Humboldtallee 1,
3400 Gottingen, W. Germany). *Digestion* 16(1/2):
0-164; 1977.

udies were carried out in 33 patients with acute
ncreatitis to determine whether the amylase to
eatinine clearance ratio (C_{am}/C_{cr}) is specific
r acute pancreatitis and whether this index is
re useful than routine estimation of serum and
ine amylase in these cases. It has been suggested
at a ratio above 5.3% is specific for acute pan-
eatitis. Twenty-one healthy persons and 19 pa-
ents with renal insufficiency served as controls.
the 21 normal controls, the mean C_{am}/C_{cr} ratio
s 1.8 ± 1.0%. On the day of admission, 28/33
tients with acute pancreatitis had elevated serum
d/or urinary amylase levels; however, the C_{am}/C_{cr}
tio was below 5.3% in 10/28 and raised in 18/28 pa-
ents. In the remaining five patients with acute
ncreatitis, the amylase level was not elevated at
e first estimation of the ratio; in one, the ratio
s below 5.3% and remained so when amylase increased
e following day and in the remaining four, the ra-
o was raised. In 19 patients with renal insuffici-
cy (serum creatinine >1.5 mg%), the ratio was above
3%. Follow-up examinations showed that the estima-
ons of the C_{am}/C_{cr} ratio and serum amylase in one
tient with acute pancreatitis was only twice elevated above normal during the course of the disease and, as in the other cases studied, did not seem to parallel the amylase level. The results suggest that the C_{am}/C_{cr} ratio is not a specific index in the diagnosis of acute pancreatitis.

7044 PANCREATIC AND SALIVARY AMYLASE/CREATININE CLEARANCE RATIOS IN NORMAL SUBJECTS AND IN PATIENTS WITH CHRONIC PANCREATITIS.

(Eng.) Hegarty, J. E.; O'Donnell, M. D.; McGeeney, K. F.; Fitzgerald, O. (Royal Postgraduate Medical Sch., Hammersmith Hosp., London, England). *Gut* 19(5): 350-354; 1978.

The clearance of pancreatic and salivary amylase relative to creatinine was measured in 26 control subjects and 22 patients with chronic pancreatitis to ascertain the value of the amylase/creatinine clearance ratio in the diagnosis of this disease. Control values for pancreatic amylase clearance were 2.64 ± 0.86% compared with 1.54 ± 0.95% for salivary amylase. In chronic pancreatitis, pancreatic amylase clearance ratios were significantly higher than controls ($p<0.0005$, mean 4.09 ± 1.63). The difference in clearance rate of salivary amylase did not reach a level of significance when compared with the control group. Twelve of the 22 patients showed pancreatic amylase clearance values above the normal limit of 4.4, while only 5 were abnormal when the clearance of total amylase was measured. The patients also showed statistically higher ($p<0.0005$) levels of serum salivary amylase when compared with 69 control sera. No such difference was found for the pancreatic component of serum amylase. Comparison of β_2-microglobulin clearance values showed no statistical difference between patients and controls. The results suggest that this rapid, simple, reproducible, and inexpensive method should be included as part of the investigation of patients with suspected chronic pancreatitis.

7045 VISCOSITY AND TRYPSIN ACTIVITY OF PURE PANCREATIC JUICE IN CHRONIC PANCREATITIS.

(Eng.) Tympner, F.; Rosch, W. (Tympner, Medizinische Klinik mit Poliklinik der Universitat Erlangen-Nurnberg, Krankenhausstr. 12, 8520 Erlangen, W. Germany). *Acta Hepatogastroenterol.* 25(1):73-76; 1978.

The viscosity and trypsin activities of pure pancreatic juice were determined in 20 patients with chronic pancreatitis and compared with those in 20 healthy subjects. Both trypsin activity and viscosity were significantly greater in the patients with pancreatitis than in the healthy subjects ($p<0.01$). The determination of viscosity and trypsin activity in pure pancreatic secretions may be useful in the diagnosis of chronic pancreatitis.

7046 THE ELEVATION OF INTRADUCTAL PRESSURE AS A PATHOGENIC FACTOR IN ACUTE PANCREATITIS IN THE RAT [Abstract].

(Eng.) Horn, J.; Diebolder,

H. (Department fur Chirurgie, Universitat Ulm, Ulm, W. Germany). *Ir. J. Med. Sci.* 146(Suppl. 1):47; 1977.

7047 SCREENING TEST FOR PANCREATITIS [Abstract]. (Eng.) Shimamura, J.; Fridhandler, L.; Berk, J. E.; LaRue, S.; Meshkinpour, H. (Dept. Medicine, Univ. California, Irvine, CA). *Clin. Res.* 26(2):113A; 1978.

7048 ABNORMALITIES IN PURE PANCREATIC JUICE (PPJ) FROM HUMAN CHRONIC ALCOHOLICS [Abstract]. (Eng.) Renner, I. G.; Rinderknecht, H.; Valenzuela, J. E.; Douglas, A. P. (Veterans Admin. Hosp., Sepulveda, CA). *Clin. Res.* 26(2):112; 1978.

7049 STEROID TREATMENT AND PANCREATITIS [Abstract]. (Eng.) Bourry, J.; Sarles, H. (INSERM U 31, 46 chemin de la Gaye, 13009 Marseille, France). *Digestion* 16(1/2):205; 1977.

7050 FUNCTIONAL STATUS OF THE LIVER AND ENZYMATIC CHANGES IN PATIENTS WITH CHRONIC PANCREATITIS. (Rus.) Gidaiatov, A. A. (Dept. Gastroenterology, Azerbaidzhan Inst. Roentgenology, Radiology and Oncology, Baku, USSR). *Klin. Med. (Mosk.)* 55(2):50-54; 1977.

7051 ANALYSIS OF INTRAHEPATIC HEMOCIRCULATION IN PATIENTS WITH CHRONIC PANCREATITIS USING RHEOGRAPHIC DATA. (Rus.) Zoria, V. G.; Zarudniak, V. M.; Kadoshchuk, T. A. (Dept. Surgery, Pediatric Faculty, N. I. Pirogov Vinnitsa Medical Inst., Vinnitsa, USSR). *Klin. Khir.* (4):25-29; 1977.

7052 INVESTIGATION OF THE HEMOSTATIC SYSTEM IN CHRONIC PANCREATITIS. (Rus.) Orlov, V. A.; Iakunin, G. A.; Grishina, N. B.; Orekhova, N. S. (Clinical Hosp. No. 20, Moscow, USSR). *Ter. Arkh.* 49(2):80-85; 1977.

7053 SUPPRESSION OF PANCREATIC LIPASE ACTIVITY IN ACUTE PANCREATITIS BY 8-OXYQUINOLIN AND TETRACYCLIN DERIVATIVES. (Rus.) Kamayev, M. F.; Valigura, Ya. S.; Grigorenko, N. V. (Dept. Pediatric Surgery, Lvov Medical Inst., Lvov, USSR). *Klin. Khir.* (4):17-20; 1977.

7054 CHRONIC PANCREATITIS WITH BISALBUMINEMIA: ITS SIGNIFICANCE, DIAGNOSTIC AND THERAPEUTIC ASPECTS [Abstract]. (Fre.) Alexandre, J. L.; Gosselin, M.; Le Calve, J. L.; Letreut, A.; Deugnier, Y.; Gastard, J. (Hopital Pontchaillou, F 35043 Rennes Cedex, France). *Gastroenterol. Clin. Biol.* 1(6/7):608-609; 1977.

7055 LYMPH SORPTION IN ACUTE PANCREATITIS AS A NEW METHOD OF ELIMINATION OF ENDOGENOUS INTOXICATION. (Rus.) Panchenkov, R. T.; Penin, V. A.; Yarema, I. V.; Urtaev, B. M.; Kuznetsov, E. V.; Yatsenko, A. A.; Tarunin, A. F. (Dept. Hosp. Surgery, N. A. Semashko Moscow Medical Inst. Stomatology, Moscow, USSR). *Vestn. Khir.* 118(4):33-36; 1977.

7056 CHRONIC SCLEROSING PANCREATITIS IN RUBELLA EMBRYOPATHY. (Ger.) Burdelski, M.; Lucking, T.; Pichlmayr, R. (Kinderklinik der Medizinischen Hochschule, D-3000 Hannover, W. Germany). *Monatsschr. Kinderheilkd.* 125(5):557-559; 1977.

7057 ACUTE PANCREATITIS OF PSEUDOTUBERCULOUS ETIOLOGY IN CHILDREN. (Rus.) Shapkina, A. P.; Antonenko, F. F.; Vishnyakov, A. K.; Khodov, S. M. (Dept. Pediatric Surgery, Vladivostok Medical Inst., Vladivostok, USSR). *Vestn. Khir.* 118(4):71-74; 1977.

7058 EXOCRINE PANCREATIC FUNCTION IN CHRONIC ALCOHOLICS IN AUSTRIA. (Ger.) Pointner, H.; Flegel, U.; Bayer, P. M.; Czembirek, H.; Kryspin-Exner, K. (I. Medizinischen Universitatsklinik, Lazarettgasse 14, A-1097 Wien, Austria). *Wien. Klin. Wochenschr.* 89(13):452-455; 1977.

7059 CAUSES OF DEATH IN NECROTIZING PANCREATITIS. ANALYTICAL STUDY OF AUTOPSY CASES. (Ger.) Nagel, K. H.; Putzke, H. P. (Institut fur Allgemeine und Spezielle Pathologie der Wilhelm-Pieck-Universitat, Strempelstrasse 14, DDR-25 Rostock, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(1):17-22; 1977.

7060 CHRONIC RELAPSING PANCREATITIS IN A CHILD--ENDOSCOPIC DIAGNOSIS: A CASE REPORT. (Eng.) Alwmark, A.; Jonson, G.; Mattsson, K. (Central Hosp., Kristianstad, Sweden). *Acta Chir. Scand.* 143(4):253-255; 1977.

7061 ACUTE PANCREATITIS SECONDARY TO FUROSEMIDE WITH ASSOCIATED HYPERLIPIDEMIA. (Eng.) Call, T.; Malarkey, W. B.; Thomas, F. B. (Ohio State Univ. Hosp., 410 W. Tenth Ave., Columbus, OH 43210). *Am. J. Dig. Dis.* 22(9):835-838; 1977.

7062 AZATHIOPRINE-ASSOCIATED ACUTE PANCREATITIS (Eng.) Paloyan, D.; Levin, B.; Simonowitz D. (Univ. Chicago Hosp., 950 E. 59th St., Chicago, IL 60637). *Am. J. Dig. Dis.* 22(9):839-840; 1977.

7063 ACUTE ALCOHOLIC PANCREATITIS: CURRENT CONCEPTS AND CONTROVERSIES. (Eng.) Kraft, A. R.; Saletta, J. D. (Cook County Hosp., Chicago, IL). *Surg. Annu.* 8:145-171; 1976.

7064 PANCREATICODUODENAL ARTERY ANEURYSMS IN GAS ABSCESS PANCREATITIS. (Eng.) Goodma

G. A. (Reading Hosp. and Medical Center, West Reading, PA). *J. Can. Assoc. Radiol.* 28(3):222-223; 1977.

7065 ACUTE PANCREATITIS AFTER CIMETIDINE ADMINISTRATION IN EXPERIMENTAL DUODENAL ULCERS [Letter to Editor]. (Eng.) Joffe, S. N.; Lee, F. D. (Royal Infirmary, Glasgow G4 OSF, Scotland). *Lancet* 1(8060):383; 1978.

7066 SPLENECTOMY: ITS PLACE IN OPERATIONS FOR INFLAMMATORY DISEASE OF THE PANCREAS. (Eng.) Haff, R. C.; Page, C. P.; Andrassy, R. J.; Buckley, C. J. (Wilford Hall U.S. Air Force Medical Center, Lackland Air Force Base, TX 78236). *Am. J. Surg.* 134(5):555-557; 1977.

See also, 6667, 6673, 6674, 6675, 6772, 6773, 6805, 6873, 6932, 7031, 7033, 7036, 7174, 7176, 7198, 7205.

LIVER AND BILIARY TRACT

7067 DIAGNOSTIC SIGNIFICANCE AND SPECIFICITY OF BILE CANALICULI ANTIBODY (BCA) IN PATIENTS WITH DIFFERENT LIVER DISEASES AND IN NORMAL CONTROLS. (Ger.) Hess, G.; Arnold, W.; Meyer zum Buschenfelde, K. H. (II. Medizinische Universitatsklinik und Poliklinik, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Innere Med.* 3(3):131-136; 1976.

Sera from patients with various hepatopathies and from healthy control subjects were tested for the presence of bile canaliculi antibodies (BCA) by the fluorescent antibody technique using cryostat sections of bovine liver. The incidences of BCA were 21/45 in acute hepatitis, 34/65 in chronic active hepatitis (24/29 in hepatitis B surface antigen [HBsAg]-negative and 10/16 in HBsAg-positive patients), 6/24 in liver cirrhosis, 4/17 in primary biliary cirrhosis, 14/39 in clinically healthy HBsAg carriers, and 7/48 in control subjects. It was not possible to clarify the antigenic substrate. In agreement with data in the literature, these results show that the occurrence of BCA has no substantial diagnostic or prognostic value.

7068 ASSESSMENT OF FAT CONTENT OF LIVER BY A PHOTON SCATTERING TECHNIQUE. (Eng.) Puumalainen, P.; Olkkonen, H.; Sikanen, P. (Dept. Physics, Univ. Kuopio, SF-70101 Kuopio 10, Finland). *Int. J. Appl. Radiat. Isot.* 28(9):785-787; 1977.

A photon-scattering method was applied to the measurement of the fat content of the liver in autopsy specimens from five normal subjects and from nine patients with diffuse liver diseases. This technique is based on the determination of the coherently- and Compton-scattered photons in a narrowly collimated geometry using a semiconductor detector and a multichannel analyzer. In the energy spectrum, the peaks due to coherently- and Compton-scattered photons are well distinguished. The ratio of the peak areas comes from $A_{coh}/A_{Compt}=\overline{Z}^3\overline{A}/\overline{Z}$ where $\overline{Z}$ and $\overline{A}$ are the average atomic and mass numbers of the target atoms. The three fatty liver specimens and the four with stasis had significantly lower coherent/Compton ratios compared with normal specimens ($p<0.01$). The coefficient of variation of the repeated studies was under 2%. Equipment suitable for *in vivo* measurement of liver fat content is presented. A broadly collimated 500 mCi ^{241}Am annular source was used as a radiation source and a Ge semiconductor crystal as a detector. A rectangular liver phantom immersed into a water tank was used to test the validity of the method. The phantom was filled with varying concentrations of *tert*-butanol, whose effective charge number is close to that of fatty tissue. The A_{coh}/A_{Compt} ratio correlated highly significantly with the *tert*-butanol content ($r=0.997$). The coefficient of variation was under 3%. This method seems feasible for liver fat measurements *in vivo*, e.g., in following the progress of a disease or the effect of a treatment.

7069 RELATIONSHIP BETWEEN LIVER TESTS AND SERUM IgA, IgM and IgG LEVELS. (Pol.) Hankiewicz, J.; Bujniewicz, E. (I Klinika Chorob Wewnetrznech, Instytut Chorob Wewnetrzynch Sl. AM, ul. Podchorazych 3 m 13, 40-043 Katowice, Poland). *Przegl. Lek.* 35(3):337-342; 1978.

Correlations were studied between the serum IgA, IgG, and IgM levels and the results of liver tests (thymol, Takata-Ara, cadmium, iodide, Kunkel, 66-test, and uranyl acetate test) in 43 patients with liver diseases, 8 patients with diseases of the bile ducts, 20 patients with other diseases, and 12 healthy controls. Correlation was found between the serum immunoglobulin levels and the test results: the increases in the test parameters were usually accompanied by increases in the immunoglobulin levels; however, not all results of all tests changed in this manner. The negative liver tests were usually accompanied by a lack of change of the immunoglobulin levels. Increases in measured parameters were accompanied mainly by increased IgG levels. Positive Takata-Ara, iodide, cadmium, and Kunkel tests, with a simultaneous lack of change in the thymol test and 66-test, were usually accompanied by an increased IgA level. Changes in the thymol and 66-tests were reflected principally by changes in the IgM levels.

7070 DIAGNOSTIC APPLICABILITY OF INTRA-VITAL MORPHOLOGIC EXAMINATION OF THE LIVER IN CHRONIC HEPATOPATHY. (Pol.) Nowak, H. F.; Boron, P.; Dadan, H.; Szpakowicz, T.; Zalewski, J. (Klinika Chorob Zakaznych, 15-540 Bialystok, Poland). *Patol. Pol.* 28(4):515-519; 1977.

The diagnostic value of intravital morphological investigation of liver specimens obtained by biopsy or by curative or exploratory surgery in 71 patients with various hepatopathies was studied and compared with the clinical diagnosis. The histomorphological diagnosis was in agreement with the clinical diagnosis in 43/71 cases (in 8/15 patients with chronic persistent hepatitis, in 5/9 patients with chronic aggressive hepatitis, in 1/7 patients with chronic aggressive hepatitis with cirrhosis, in 1/2 patients with liver cirrhosis, in 1/8 patients with unspecific chronic hepatitis, in 1/3 patients with primary liver carcinoma, and in 26/27 patients with hepatic metastases). Among the 28 cases in which the histomorphological diagnosis did not agree with the clinical one, exacerbated chronic cholecystitis was diagnosed clinically in 13 cases, liver cirrhosis in 11, and status after viral hepatitis in 2. No clinical diagnosis was established in one case. The findings indicate the usefulness of intravital morphological examination of the liver in conjunction with other diagnostic methods for defining accurately the type of diffuse hepatic lesions and the type of liver tumors involved.

7071 DIAGNOSIS OF EXTRA-HEPATIC ABNORMALITIES ON DYNAMIC STUDY OVER THORACO-ABDOMINAL REGION PRIOR TO HEPATIC IMAGING. (Eng.) Siddiqui, A. R.; Wellman, H. N. (Indiana Univ. Sch. Medicine, 1100 W. Michigan, Indianapolis, IN 46202). *Clin. Nucl. Med.* 3(6):214-216; 1978.

Findings in 262 thoraco-abdominal dynamic studies done at the time of hepatic imaging are reviewed to determine the number and types of extrahepatic abnormalities. Twenty-nine extrahepatic abnormalities were diagnosed solely on the basis of these studies, including pericardial and pleural effusions and decreased perfusion to one lung. Half of these abnormalities were not suspected clinically. The dynamic study is an important part of hepatic imaging and should be performed routinely. Besides aiding in the differential diagnosis of various hepatic lesions, extrahepatic abnormalities can be discovered.

7072 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY WITH THE CHIBA NEEDLE. (Por.) Onishi, I.; Carrilho, F. J.; Paranagua, D. F.; Zeitune, J. M. R.; Muarrek, F. J.; Pareja, J. C.; *et al.* (Setor de Radiologia da Gastroclinica de Londrina, Universidade Estadual de Londrina, Londrina, Brazil). *Arq. Gastroenterol.* 14(4):205-209; 1977.

Percutaneous transhepatic cholangiography (PTC) with the Chiba needle was performed in 50 patients with intrahepatic or extrahepatic cholestasis. A success rate of 88% was achieved whether or not the intrahepatic bile duct was dilated. Neoplasia of the bile ducts, head of the pancreas, papilla, and gallbladder were diagnosed in 18 cases, cholelithiasis in 15, acute hepatitis in 3, chronic cholangitis in 2, chronic cholangitis in 2, cholecystoduodenal fistula in 1, pseudocyst of the head of the pancreas in 1, iatrogenic stenosis of the common bile duct in 1, inflammation of the papilla in 1, and pathology of unknown origin in 2. The success rate was 18/18 for neoplasias; 16/18 for cholelithiasis; 6/9 for hepatitis and cholangitis, 3/3 for fistulas, pseudocysts, and iatrogenic stenosis; and 1/2 for pathology of unknown origin. PTC was well tolerated; hemorrhage occurred in only one patient. The findings indicate the great value of PTC in the diagnosis of cholestasis.

7073 PORTAL DIVERSION FOR HEPATIC METABOLIC DISEASES. (Fre.) Bismuth, H.; Franco, D.; Grange, D. (Hopital Paul-Brousse, F 94800 Villejuif, France). *Gastroenterol. Clin. Biol.* 1(11):903-916; 1977.

A review of the use of portal diversions for the management of liver glycogenosis and hypercholesterolemia is presented. Terminolateral (19) and laterolateral (1) portacaval anastomoses and portacaval transpositions (3) were performed to correct severe glycogenosis (types I, III, and VI) involving life-threatening hypoglycemic accidents, very frequent meals, and growth and/or psychomotor retardation. Complete or partial correction of the hypoglycemia and improved tolerance to fasting occurred in all patients; lactic acidosis, hyperuricemia, and platelet disorders usually disappeared entirely, and remarkable growth spurts were seen in most cases. Improvement was often very gradual and sometimes took up to 1 yr. No specific complications arising from the portal shunt (specifically, no encephalopathies) were seen in any patients up to 10 yr after surgery. Familia type II hyperlipoproteinemia, an autosomal dominant disorder, in its homozygous form generally leads to death before age 20 from atherosclerotic complications. Terminolateral anastomoses have been performed on 11 patients with this disease. All patients benefited from an improvement in symptoms, including the disappearance of xanthomas and an average decrease of 40% in plasma cholesterol and beta-lipoproteins. Angina lessened in five of eigh patients, allowing an increase in physical activity Although atheromatous lesions did not regress, thei evolution was arrested. Even though long-term resu are not yet available on these patients, the surgery is recommended for homozygous patients showing early xanthomas whose serum cholesterol and betalipoproteins cannot be reduced by at least 40% through medical treatment. The mechanism by which portal shunts ameliorate these metabolic disorders is not fully known, although it probably involves the increased availability of peripheral glucose and/or insulin in glycogenosis and a diminished synthesis or accelerated degradation of cholesterol in hypercholesterolemia.

7074 UPTAKE OF IRON BY DUODENAL BIOPSY SPECIMENS FROM PATIENTS WITH IRON-DEFICIENCY ANAEMIA AND PRIMARY HAEMOCHROMATOSIS. (Eng.) Cox, T. M.; Peters, T. J. (Royal Postgraduate Medical Sch., Du Cane Rd., London W12 OHS, England). *Lancet* 1(8056):123-124; 1978.

To investigate the control of iron absorption, initial rates of iron uptake by duodenal mucosa were determined in biopsy specimens from 12 normal subjects, 4 patients with iron deficiency anemia, and 5 patients with primary hemochromatosis. The mucosal iron content in patients with iron deficiency anemia was significantly lower than that in controls ($p<0.05$). When the Fe^{3+} concentration of the incubation medium was 450 μM, there was a threefold increase in iron uptake by biopsy specimens from patients with iron deficiency anemia ($p<0.01$). Uptake at 180 μM Fe^{3+} was also increased. At the higher concentration of 450 μM, iron uptake by specimens from patients with hemochromatosis was no different from normal. In controls and patients with hemochromatosis, unidirectional iron uptake reached a saturation point over the concentration range 18-450 μM Fe^{3+} in the incubation medium. Although uptake at the higher iron concentrations was similar in the two groups, at the lower concentrations, uptake in hemochromatosis patients was significantly greater. Kinetic analysis showed a significantly lower apparent K_t for iron uptake by the mucosa from patients with hemochromatosis (34 ± 6 μM) compared with controls (125 ± 54 μM, $p<0.05$), although the V_{max} was not different. In iron deficiency, there was a significant increase in V_{max} (27.2 ± 7.1 pmol/mg/min) in comparison with controls (9.3 ± 1.5, $p<0.01$), and there was an associated rise in K_t (290 ± 184 and 125 ± 54 μM, resp.). This result may be related to the limiting effect of diffusion across the unstirred layer of medium when high V_{max} conditions are operating. The kinetic data suggest that the inappropriately high iron uptake by specimens from the iron-overloaded patients is the result of the affinity for iron being increased in a carrier in the enterocyte.

7075 HEPATIC ADENOMA AND ORAL CONTRACEPTIVES. (Fre.) Hureau, J.; Benit, C.; Delavierre, P.; Bourdais, J. P. (Hopital de Vaugirard, 389, rue de Vaugirard, 75015 Paris, France). *J. Chir. (Paris)* 114(5):339-350; 1977.

A case of hepatic adenoma in a 31-yr-old woman who had been taking oral contraceptives continuously for 10 yr is reported, and the alarming increase of this rare tumor in recent years is discussed. The preoperative diagnosis is fairly easy when hepatic arteriography, radioisotopic scan, and echotomography are combined with radiologic examinations of neighboring organs. Treatment consists of surgical removal of the affected segment and should not be delayed, since painful intratumoral bleeding often occurs. Cataclysmic hepatic hemorrhaging that results when the tumor ruptures externally is responsible for a death rate of 15.9%. Although not conclusively proven, mestranol appears to be the culpable ingredient in oral contraceptives, since 93.1% of women with hepatic adenomas have taken it, whereas only 44.8% of a control group free of hepatic lesions had been given a mestranol preparation. A review of the clinical, pathological, and pathogenic aspects of hepatic adenomas is given.

7076 RADIO- AND ENZYMEIMMUNOASSAY OF SERUM ALPHA-FOETO-PROTEIN IN SECONDARY CANCER OF THE LIVER. (Eng.) Masseyeff, R.; Rey, J. F.; Maiolini, R.; Krebs, B.; Delmont, J. (Laboratoire d'Immunologie, U.E.R. de Medecine, Chemin de Vallombrose, 06000 Nice, France). *Rend. Gastroenterol.* 9(2):91-96; 1977.

Serum alpha fetoprotein (AFP) was quantitated in 97 patients with secondary liver cancer, and radioimmunoassay (RIA) and enzyme-immunoassay (EIA) were compared for their efficacy in this determination. EIA and RIA gave similar results, with a correlation coefficient of 0.98 at $p \geq 0.001$. Twenty-three patients had AFP levels of 10 ng/ml or greater. Seven patients had levels >100 ng/ml, the highest being 610 ng/ml. Of the 23 patients with abnormal AFP levels, 45% had the primary tumor in the stomach, whereas only 20% of the 74 patients with normal AFP levels had primary stomach cancer. Further studies are needed to determine whether the site of abnormal AFP production in secondary liver cancer is the primary tumor, the metastatic tumor, or the area surrounding the metastasis. The close correlation between the results of EIA and RIA suggest that they can be used interchangeably, but EIA is a simpler and faster procedure.

7077 CLINICAL AND THERAPEUTIC ASPECTS OF HEPATOCELLULAR CARCINOMA. (Eng.) Johnson, P. J.; Williams, R. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London SE5, England). *Trans. R. Soc. Trop. Med. Hyg.* 71(6):462-465; 1978.

Hepatocellular carcinoma (HC) is reviewed. It is a major problem in certain parts of the Third World, but much less common in the West. In all areas of the world, about 70% of patients with HC have underlying cirrhosis, but the relationship between the two is not clear. Hepatitis B virus and aflatoxin have been suggested as carcinogenic environmental agents. Men are more susceptible to malignant change than are women, and the risk of such change increases with age. Both benign and malignant tumors have been associated with the contraceptive pill. The commonest modes of presentation are persistent right-sided upper abdominal pain and general deterioration in a patient with underlying cirrhosis. Routine liver function tests seldom permit discrimination of HC and cirrhosis, but α-fetoprotein determinations are a valuable discriminatory test, as levels rarely exceed 500 mg/ml in benign liver disease, but are >1,000 mg/ml in HC, and about 70% of HC cases will be positive by this criterion. Hepatic scintiscanning is useful in showing the extent of the lesion. Pathological confirmation is desirable, and this is usually obtained by percutaneous liver biopsy via a right lateral approach. The use of laparoscopy varies widely, but can be of value in selected cases, particularly in determining whether there is peritoneal spread. Hepatic arteriography is of diagnostic value in demonstrating the characteristic appearances of an abnormal vascular pattern when other tests have been inconclusive and in determining the extent of the tumor and its relation to the arterial supply and lobes of the liver. Management depends upon the extent of the tumor and on whether there is underlying cirrhosis. Resection may be undertaken when there is no cirrhosis; up to 7/8 of the liver may be removed. Hepatic artery ligation is useful in relieving pain and shrinking the tumor mass, but may only be used if there is no cirrhosis. In patients without metastasis, liver transplantation may be attempted. When metastases are present or the patient is otherwise too ill for surgery, chemotherapy is the only available approach, and various regimens have been used with varying success.

7078 LIVER METASTASES DISCOVERED DURING HIGH-DOSE EXCRETORY UROGRAPHY. (Eng.) Brennan, R.; Cossrow, J.; Pollack, H. (Thomas Jefferson Univ. Hosp., Philadelphia, PA 19107). *Radiology* 127(2):373-375; 1978.

The detection of hepatic metastases during excretory urography with tomography (EUT) is documented. The discovery of one such case prompted a retrospective review of the records of 106 patients who had had focal hepatic defects on ^{99m}Tc-labeled sulfur colloid liver scans; 18 were found to have had EUT that also included the posterior third to one-half of the right lobe of the liver on the tomograms. Of these 18, 3 had one or more liver masses visualized by EUT as round, lucent, hepatic filling defects during total body opacification. Radiologists performing high-dose EUT should routinely scrutinize the hepatogram because metastases, cysts, or abscesses may be visualized. Final diagnosis of such masses usually depends on additional diagnostic modalities.

7079 PERCUTANEOUS EMBOLIZATION FOR THE MANAGEMENT OF HEPATIC ARTERY ANEURYSMS. (Eng.) Goldblatt, M.; Goldin, A. R.; Shaff, M. I. (Groote Schuur Hosp., Observatory, Cape Town 7925, South Africa). *Gastroenterology* 73(5):1142-1146; 1977.

The cases of three patients who were treated for hepatic artery aneurysms with percutaneous embolization are presented. The first patient was a 55-yr-old woman who presented with hematemesis and debility. Celiac axis arteriography demonstrated a large tortuous aneurysmal sac arising from a branch of the left hepatic artery. Superselective embolization was carried out by injecting pledgets of gelfoam suspended in contrast medium. Celiac arteriography 7 weeks after embolization demonstrated no recurrence of the aneurysm. The second patient, a 30-yr-old male schizophrenic receiving phenothiazines, presented with hematemesis, melena, jaundice, pyrexia, epigastric tenderness, and elevated WBC count. The presence of a pyogenic abscess was suggested by ultrasound and confirmed by examination of a biopsy specimen taken at surgery. Hemoperitoneum and hematobilia were present with the biliary tree grossly distended by a blood clot and a small necrotic hemorrhagic area present in the left lobe of the liver. Celiac arteriography revealed gross extravasation of contrast medium into a cavity in the left lobe. Selective catheterization and embolization of the left hepatic artery controlled the extravasation, and no further bleeding occurred. The third patient, a 17-yr-old boy, was found to have a false aneurysm arising from a small proximal branch of the right hepatic artery following an abdominal gunshot wound. Embolization using autologous clot via a superselective coaxial catheter resulted in occlusion of the small feeding vessel. Experience with these cases suggests that embolic therapy may be the method of choice for hepatic artery aneurysms.

7080 FAMILIAL AND NONFAMILIAL BENIGN RECURRENT CHOLESTASIS DISTINGUISHED BY PLASMA DISAPPEARANCE OF INDOCYANINE GREEN BUT NOT CHOLYLGLYCINE. (Eng.) Van Berge-Henegouwen, G. P.; Ferguson, D. R.; Hofmann, A. F.; De Pagter, A. G. F. (St. Radboud Hosp., Nijmegen, Netherlands). *Gut* 19(5):345-349; 1978.

To determine whether a defect in uptake of organic anions is present in patients with benign recurrent cholestasis, the plasma disappearance of simultaneously injected indocyanine green and cholylglycine-1-^{14}C was measured in eight patients with asymptomatic benign recurrent cholestasis, 4 with the familial type, as well as 22 healthy control subjects. Evans blue was also simultaneously injected to permit correction for variation in blood volume and speed of mixing. Indocyanine green uptake was decreased in all three patients with definite nonfamilial benign recurrent cholestasis, but was normal increased in the four patients with the familial form of the disorder. By contrast, cholylglycine-1-^{14}C uptake was abnormal in one patient with each type of the disorder. Thus, patients with nonfamilial benign recurrent cholestasis have a defect in indocyanine green uptake, and patients with benign recurrent cholestasis are heterogeneous with respect to organic anion uptake.

7081 FREQUENCY OF INTRAHEPATIC ARTERIOVENOUS FISTULA AS A SEQUELA TO PERCUTANEOUS NEEDLE PUNCTURE OF THE LIVER. (Eng.) Okuda, K.;

Musha, H.; Nakajima, Y.; Takayasu, K.; Suzuki, Y.; Morita, M.; *et al.* (Chiba Univ. Hosp., Chiba, 280, Japan). *Gastroenterology* 74(6):1204-1207; 1978.

The incidence of intrahepatic arteriovenous fistula after needle biopsy of the liver, percutaneous transhepatic cholangiography, and transhepatic catheterization of an intrahepatic bile duct or portal vein was determined by studying the hepatic arteriograms obtained within 1 month of the transhepatic procedure. An arteriovenous fistula, mostly arterioportal, occurred in 5 of the 93 patients after biopsy, in 3 of 79 after percutaneous transhepatic cholangiography, and in 7 of 26 after catheterization. None of the fistulae was so large and close to the porta hepatis as to cause portal hypertension. In one patient with an intrahepatic bile duct carcinoma, the long track of a 0.7-mm caliber needle became a fistula draining arterial blood into the parenchyma. In another, an aneurysm was found after biopsy and percutaneous transhepatic cholangiography. A small intrahepatic fistula may seal itself. A tissue defect in the liver parenchyma may eventually be filled by regenerating liver cells or the canal may be distorted and interrupted by tissue regeneration.

7082 PERFUSION VASCULARITY MISMATCH IN LIVER HEMANGIOMAS. (Eng.) Front, D.; Hardoff, R.; Israel, O.; Schneck, S. O. (Rambam Medical Center, Haifa, Israel). *Clin. Nucl. Med.* 3(6):212-213; 1978.

Three cases of large cavernous hepatic hemangiomas in which a perfusion defect in the dynamic study and slow filling of the lesion by a blood pool agent were observed are presented. This finding is explained by the low perfusion and the large blood volume of cavernous hemangiomas. When such a lesion is suspected, a late blood-pool study should be performed to demonstrate the true vascularity of the lesion.

7083 HEMOPERITONEUM FROM SPONTANEOUS RUPTURE OF HEMANGIOMA OF THE LIVER, THE VALUE OF ANGIOGRAPHIC DIAGNOSIS: A CASE REPORT. (Eng.) Nyman, U. (Malmo General Hosp., S-214 02 Malmo, Sweden). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):237-238; 1978.

A case of spontaneous rupture of a liver hemangioma in which angiography was used as a diagnostic procedure is presented. The patient, a 37-yr-old man, was hospitalized in shock, and the peritoneal cavity was found at laparotomy to be filled with blood originating from a ruptured hemangioma on the lower border of the left lobe of the liver. The hemorrhage was controlled by suturing, but the lesion could not be excised. The exact site and extention of the hemangioma was demonstrated by angiography 2 days later, thereby facilitating proper surgical removal of the bleeding source.

7084 FATAL INTRAHEPATIC HEMORRHAGE AFTER PERCUTANEOUS LIVER BIOPSY USING A MENGHINI NEEDLE: A RARE BUT REAL COMPLICATION. (Eng.) Whittle, T. S., Jr. (Veterans Admin. Hosp., 109 Bee St., Charleston, SC 29403). *South. Med. J.* 70(11): 1355-1356; 1977.

A case of fatal intrahepatic hemorrhage in a 62-yr-old woman following percutaneous liver biopsy with a Menghini needle is reported. The biopsy was done with a needle of intermediate caliber (1.2 mm) via a posterior transcostal approach. The first unsuccessful attempt was followed immediately by a second attempt with the recovery of an adequate core of tissue. The patient required meperidine hydrochloride after complaining of nausea and mild right upper quadrant pain. The patient died the day following the procedure. At autopsy, a large subcapsular hematoma involving the dome and lateral portion of the right lobe of the liver was present. There was 200 ml of freshly clotted blood within the peritoneal cavity. Sectioning the liver revealed an extensive intrahepatic subcapsular hematoma in communication with a hemorrhagic linear portal tract corresponding to the tract of the needle. This is the first known report of a fatal intrahepatic hemorrhage after percutaneous Menghini needle biopsy in a patient without a hemorrhagic diathesis or underlying liver disease.

7085 CIMETIDINE CHOLESTATIC JAUNDICE IN CHILDREN. (Eng.) Lilly, J. R.; Hitch, D. C.; Javitt, N. B. (Univ. Colorado Sch. Medicine, Denver, CO 80262). *J. Surg. Res.* 24(5):384-387; 1978.

Liver function tests, including serum bile acid determination, were carried out as part of a prospective clinical investigation of the efficacy of cimetidine therapy in children with peptic ulcer disease; the results in five patients, aged 14, 3, 2, 1.5, and 1 yr, are presented. The patients received cimetidine (20-30 mg/kg/day) i.v. or p.o., and the total daily amount was given in four to six equal increments. Two patients had pre-existing liver disease. In the latter patients, peak serum bilirubin levels occurred before the institution of cimetidine therapy. There was a second minor rise in one of these patients 14 days after treatment was started. In the other three patients, the bilirubin level was elevated 14, 37, and 16 days, resp., after the initiation of cimetidine; the maximum elevations were 1.8, 2.9, and 2.3 mg%, resp. Total serum bile acids increased eight- and ninefold in the patients with pre-existing liver disease after cimetidine was started. In the three patients with normal liver function, the maximum total serum bile acid reached 14, 32, and 34 μM on the 10th, 15th, and 4th days after the initiation of therapy, resp. The values fell below the original value in one patient with liver disease and remained somewhat above the original value in the other. The values returned to normal before or shortly after discontinuing the drug in the patients with normal hepatic function. Because transaminases in all patients remained within, or almost within, normal limits, the elevated serum bile acids may represent a transient cholestasis rather than a manifestation of liver cell necrosis.

7086 PORPHYRIA CUTANEA TARDA TREATED WITH LOW DOSES OF ANTIMALARIAL AGENTS: LIVER FINDINGS.

(Cze.) Chlumsky, J.; Dobias, J.; Chlumska, A.; Malina, L. (I. interni klinika lekarske fakulty hygienicke, Universita Karlova, Srobarova 50, 100 34 Praha 10, Czechoslovakia). *Cas. Lek. Cesk.* 116 (45):1404-1406; 1977.

The effectiveness of the antimalarial agent chloroquine (125 mg twice weekly for 3-8 months) was studied in 32 patients with porphyria cutanea tarda. All patients achieved complete clinical and metabolic remission. The chloroquine tolerance proved to be satisfactory, even though a transient increase in the serum transaminase activity pointed to a certain stress of the hepatic parenchyma. Hepatic morphology was studied in 29 patients; the treatment caused no morphological changes in 25/29 cases and deterioration in 4 (2 patients with chronic hepatitis, 1 patient with uncharacteristic changes, and 1 with fibrosis). Hepatological investigations supplemented by liver biopsy are useful for the determination of the optimal complex treatment of the underlying metabolic disorder. Concomitant liver cirrhosis and chronic hepatitis call for simultaneous liver function-supporting treatment.

7087 DIAGNOSIS AND TREATMENT OF STENOSES AND OBSTRUCTIONS OF THE INTRAHEPATIC BILE DUCTS.

(Ger.) Spieler, U.; Largiader, F.; Ammann, R. (Kantonsspital, CH-8091 Zurich, Switzerland). *Helv. Chir. Acta* 44(4):471-475; 1977.

The diagnosis and treatment of 15 patients with obstruction of the intrahepatic bile ducts are described. Malignant tumors were the cause of obstruction in 11 cases, sclerosing cholangitis in 3, and post-traumatic skrinkage of scar in 1. The preoperative diagnosis was established by percutaneous transhepatic cholangiography in eight cases, by endoscopic retrograde cholangiography in four, and by laparoscopy in three. The obstruction was in the region of the hepatic bifurcation in 14 cases and in the area of the left hepatic duct in 1 case. Resection of the hepatic bifurcation and hepatic lobe with hepaticojejunostomy was performed in one case, resection of the hepatic bifurcation with hepaticojejunostomy in four, hepaticojejunostomy according to Longmire in two, and bougienage with inner splinting of the bile duct in eight cases. The postoperative mortality was 26%. The results were good concerning the restoration of bile drainage after hepaticojejunostomy and inner splinting, and poor after Longmire's operation. Primary carcinoma involving the junction of the hepatic ducts may be regarded as resectable, if the proximal extension of the tumor is limited to below the second bifurcation of the intrahepatic bile ducts in both the right and left lobes and if the proper hepatic artery and portal vein are not invaded.

7088 LIGATION OF THE HEPATIC ARTERY.

(Pol.) Piotrowicz, W.; Ancyparowicz, S.; Kawalski, A. (Klinika Chirurgii Ogolnej CMKP, ul. Czerniakowska 231, 00-416 Warsaw, Poland). *Pol. Tyg. Lek.* 32(45): 1771-1774; 1977.

The literature on ligation of the hepatic artery is reviewed. The indications for ligation of the hepatic artery are hepatic trauma, bleeding liver tumors, and rupture of an aneurysm of the hepatic artery. Ligation of the hepatic artery with subsequent intra-arterial treatment with 5-fluorouracil has been applied successfully in the treatment of patients with liver tumors. The mortality of ligation of the hepatic artery is about 18%.

7089 LIGATURE OF A HEPATIC ARTERY FOR LIVER TUMOR.

(Fre.) de Montalier, H.; Boiselle J. C. (Hopital Bichat, 170, boulevard Ney, 75018 Paris, France). *Ann. Chir.* 31(8):711-718; 1977.

The palliative treatment of multiple liver tumors by ligature of the hepatic artery is reviewed, and two cases of hepatic artery ligature for multiple liver metastases from carcinoid tumors of the small intestine are presented. Both patients had severe symptoms of carcinoid tumors, with flush and diarrhea and high urinary levels of 5-HIA (409 and 68 mg/24 hr, resp.). The clinical symptoms disappeared immediately after surgery and the 5-HIA levels were lowered within 5 days (to 72.5 and 47.3 mg/24 hr, resp.). There were transitory perturbations in SGPT, prothrombin, and bilirubin levels, but the values normalized within 2 weeks. One patient was in excellent health 18 months later; the other died after a total remission lasting 20 months. A review of the literature reveals nine similar cases with total remissions beginning right after surgery; all patients were still in good health 10 weeks to 18 months later. When ligature of the hepatic artery was performed for other types of metastases and for multiple hepatomas, the mean survival of patients was not much improved (from 75 days to 4.5 months), but the clinical remission was often excellent. When local chemotherapy was associated with the surgery (usually 5-fluorouracil at 12 mg/k day for 20 to 45 days, infused into the distal end of the hepatic artery), remissions of up to 22 months have been obtained, but the results are stil too preliminary to determine the effectiveness of this combination treatment.

7090 ALTERED DRUG METABOLISM AFTER GLUTETHIMID IN LIVER DISEASE [Abstract].

(Eng.) Farrell, G. C.; Cooksley, W. G. E.; Powell, L. W.; Cash, G. A. (Royal Brisbane Hosp., Brisbane, Australia). *Clin. Res.* 26(2):109A; 1978.

7091 CEA AND THE LIVER [Letter to Editor].

(Eng.) Barritt, A. S.; Zamcheck, N.; Loewenstein, M. S. (Veterans Admin. Hosp., Salem, VA 24153). *Gastroenterology* 73 [illegible], Part [illegible] 863; 1977.

7092 STRUCTURE AND CONCENTRATION OF DUODENAL FERRITIN IN IRON STORAGE DISORDERS [Abstract]. (Eng.) Halliday, J. W.; Mack, U.; Powell, L. W. (Dept. Medicine, Univ. Queensland, Brisbane 4029, Queensland, Australia). *Clin. Exp. Pharmacol. Physiol.* 4(5):466-467; 1977.

7093 CLINICAL EXPERIENCE IN STUDYING HEPATIC TISSUE CIRCULATION. (Rus.) Rutkovsky, O. V.; Sukhotsky, S. S.; Semendyaeva, M. E.; Galperin, E. I. (Inst. Organ and Tissue Transplantation, USSR Ministry Health, USSR). *Sov. Med.* (9):104-107; 1977.

7094 LIVER SUBSTITUTION AND LIVER GRAFTING. (Ger.) Pichlmayr, R.; Bockhorn, H.; Bunzendahl, H. (Medizinische Hochschule Hannover, Karl-Wiechert-Allee 9, D-3000 Hannover 61, W. Germany). *Munch. Med. Wochenschr.* 120(7):207-210; 1978.

7095 CLINICAL AND SURGICAL ASPECTS OF LIVER RESECTION. (Ger.) Grill, W. (Kreiskrankenhaus, D-8130, Starnberg, W. Germany). *Munch. Med. Wochenschr.* 120(7):211-214; 1978.

7096 UREA CYCLE ENZYME DEFICIENCIES IN THE ACUTE FATTY LIVER OF PREGNANCY (AFLP) [Abstract]. (Eng.) Weber, F., Jr.; Snodgrass, P.; Rao, P.; Powell, D.; Huffman, S.; Brady, P. (Veterans Admin. Hosp., Lexington, KY). *Gastroenterology* 72(5, Part 2):1146; 1977.

7097 HEMOBILIA: SOME SALIENT FEATURES AND THEIR CAUSES. (Eng.) Sandblom, P.; Mirkovitch, V. (Emory Univ. Sch. Medicine, 69 Butler St., Atlanta, GA 30303). *Surg. Clin. North Am.* 57(2):397-419; 1977.

7098 VASCULAR OCCLUSION. (Eng.) Mays, E. T. (Univ. Kentucky Coll. Medicine, Lexington, KY 40502). *Surg. Clin. North Am.* 57(2):291-323; 1977.

7099 OSTEOMALACIA, OSTEOPOROSIS, AND PARATHYROID FUNCTION IN CHRONIC LIVER DISEASE [Abstract]. (Eng.) Long, R. G.; Meinhard, E.; Varghese, Z.; Willis, M. R.; Sherlock, S. (Royal Free Hosp., London, England). *Gut* 18(5):A401; 1977.

7100 HISTOTOPOGRAPHY OF PORPHYRINS IN LIVER AND KIDNEYS IN DIFFERENT FORMS OF PORPHYRIA AND IN OTHER DISEASES [Abstract]. (Eng.) Zawirska, B. (Dept. Pathological Anatomy, Medical Acad., Wroclaw, Poland). *Folia Histochem. Cytochem. (Krakow)* 15(2):169; 1977.

7101 THIN LAYER CHROMATOGRAPHY AND FLUORESCENT SCANNING ANALYSIS OF PORPHYRINS. (Eng.) Miura, T.; Torinuki, W. (Tohoku Univ. Sch. Medicine, Sendai, Japan). *Tohoku J. Exp. Med.* 121(1):57-61; 1977.

7102 PORPHYRIA CUTANEA TARDA FOLLOWING LEAD UPTAKE: A CASUISTIC CONTRIBUTION TO ETIOLOGY. (Ger.) Zschunke, E.; Wolf, I. (Zentralinstitut fur Arbeitsmedizin, Noldnerstrasse 40, DDR-1134 Berlin, E. Germany). *Z. Gesamte Inn. Med.* 32 (11):248-250; 1977.

7103 LIVER RUPTURE: A REVIEW. (Nor.) Tveter, K. J.; Ramstad, H. (Aust-Agder Sentralsjukehus, Aust-Agder, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):4-9; 1978.

7104 SCHWANNOMA OF THE DIGESTIVE TRACT WITH HEPATIC METASTASES. (Fre.) Duriez, R.; Daly, J. P.; Halpert, J.; Larroque, P.; Thevenot, J.; Pats, B. (Hopital d'Instruction des Armees Begin, 69, avenue de Paris, F 94160 Saint-Mande, Paris, France). *Ann. Med. Interne (Paris)* 128(11): 895-897; 1977.

7105 PLACE OF AUTONOMOUS LIVER TUBERCULOSIS IN HEPATIC PATHOLOGY. (Fre.) Kayabali, I.; Cam, R.; Kurterdem, E.; Aksoy, F.; Keles, C.; Demir, S.; Okesli, N. (Clinique Chirurgicale de la Faculte de Medecine, Ankara, Turkey). *Lyon Chir.* 73(4):282-284; 1977.

7106 IDENTIFICATION OF THE DEFECT IN CHOLIC ACID (CA) SYNTHESIS IN CEREBROTENDINOUS XANTHOMATOSIS (CTX) [Abstract]. (Eng.) Salen, G.; Shefer, S.; Cheng, F. C.; Mosbach, E. H. (Veterans Admin. Hosp., East Orange, NJ). *Gastroenterology* 72(5, Part 2):1125; 1977.

7107 RECENT DEVELOPMENTS IN HEPATOBILIARY SURGERY. (Eng.) Altman, R. P. (Children's Hosp. Natl. Medical Center, Washington, DC). *Pediatr. Ann.* 6(5):87-97; 1977.

7108 BILE COMPOSITION AND "BILE CAST" FORMATION AFTER LIVER TRANSPLANTATION IN MAN [Abstract]. (Eng.) McMaster, P.; Cusick, C.; Herbertson, B.; Calne, R. Y.; Williams, R. (Dept. Surgery, Univ. Cambridge, Cambridge CB2 2QQ, England). *Eur. Surg. Res.* 9(Suppl. 1):107; 1977.

7109 THE ROLE OF SPLANCHNIC CIRCULATION IN THE REVASCULARIZATION OF THE AUXILIARY LIVER IN EXTRACORPOREAL CIRCULATION: EXPERIMENTAL DATA. (Ita.) Ceriati, F.; Ardito, G.; Cavallaro, A.; Cavicchioni, C.; Aronne, O.; Lemmo, G.; Garcovich, A. (Istituto di Patologia Speciale Chirurgica e Propedeutica Clinica, Universita Catolica "S. Cuore," Rome, Italy). *Chir. Patol. Sper.* 24(2): 119-129; 1976.

7110 ELECTIVE HEPATIC RESECTIONS. (Eng.) Adson, M. A.; Beart, R. W., Jr. (Mayo Clinic, Rochester, MN 55901). *Surg. Clin. North Am.* 57(2):339-360; 1977.

See also, 6778, 6779, 6796, 6800, 6803, 6817, 6922, 6932, 7025, 7050, 7132, 7143, 7144, 7172, 7177, 7194, 7233, 7239, 7240, 7241, 7244, 7245, 7246, 7251, 7252, 7253, 7269.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

7111 FACTORS INFLUENCING THE INCIDENCE OF NEONATAL JAUNDICE. (Eng.) Friedman, L.; Lewis, P. J.; Clifton, P.; Bulpitt, C. J. (Queen Charlotte's Hosp., London W6 0XG, England). *Br. Med. J.* 1(6122):1229-1300; 1978.

To determine whether maternal oxytocin infusion or other factors are related to the development of neonatal jaundice (peak plasma bilirubin ≥205 μM), the rate of neonatal jaundice was analyzed in 12,461 single births at one hospital during a 5-yr period. Maternal oxytocin administration was associated with jaundice in 15.3% of neonates, whereas jaundice occurred in only 12.1% of neonates whose mothers did not receive oxytocin ($p<0.001$). The effect of oxytocin infusion on jaundice was independent of gestational age at birth, sex, race, epidural anesthesia, method of delivery, and birth weight, each of which was itself significantly associated with neonatal jaundice ($p<0.001$). The effect of oxytocin, however, was small, producing a calculated mean increase in peak plasma bilirubin concentration of 8.6 μM (0.5 mg/100 ml); this excess was independent of sex and less than the effect of the baby being born 1 week early. The results show that both oxytocin and epidural anesthesia have a small effect on the incidence of neonatal jaundice, which fact probably explains the conflicting reports on the effects of these factors.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

7112 FATAL HEPATIC NECROSIS IN ASSOCIATION WITH THE USE OF HYCANTHONE: A CASE REPORT. (Eng.) Buchanan, N.; Thatcher, C. J.; Cane, R. D.; Bartolomeo, B. (Baragwanath Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 53:257-258; 1978.

A case of fatal acute massive hepatic necrosis secondary to the administration of hycanthone is reported. An 11-yr-old boy presented with hematuria, and his urine was found to contain *Schistosoma hematobium* ova. Hycanthone (100 mg, i.m.) was administered. The next day the patient vomited, became jaundiced, confused, and restless, and then became agitated (promethazine hydrochloride, 25 mg, was given); treatment for hepatic failure was begun. The next day the patient lapsed into coma, had cardiac arrest and was resuscitated, and was treated for hyperkalemia. Four additional episodes of cardiac arrest ensued, and the child died. Autopsy revealed large areas of hemorrhage, ulceration, and polypoid granulations in the bladder and irregular mottling of the liver with alternating yellowish and dark areas. Histologically, the bladder had numerous bilharzia ova in all layers, and the liver showed acute massive necrosis of short duration. It was discovered that the child was hepatitis B surface antigen-positive without history of previous disease. Excluding underlying liver disease, which may require serological or biochemical assessment, is a chief problem that makes the correct and widespread use of hycanthone impracticable.

7113 OXACILLIN HEPATITIS: TWO PATIENTS WITH LIVER BIOPSY, AND REVIEW OF THE LITERATURE. (Eng.) Bruckstein, A. H.; Attia, A. A. (St. Luke's Hosp., 113th St. and Amsterdam Ave., New York, NY 10025). *Am. J. Med.* 64(3):519-522; 1978.

Hepatotoxicity associated with i.v. sodium oxacillin therapy is reported in two drug abusers cured of staphylococcal endocarditis. One patient received 16 g oxacillin daily, and the other 12 g. Coincident with the administration of oxacillin, marked increases in hepatic SGOT (up to 1,380 IU in the first patient, to 420 IU in the second) and SGPT (up to 1,164 IU in the first patient, to 367 IU in the second) were observed, and liver biopsy showed nonspecific hepatitis. Upon cessation of oxacillin therapy, liver enzyme values returned to(ward) normal. Other reports of oxacillin-associated changes in hepatic enzyme levels are reviewed; further observation of oxacillin-associated hepatotoxicity is warranted.

7114 HEPATITIS SYPHILITICA: A CLINICO-PATHOLOGICAL STUDY OF 25 CASES. (Eng.) Jozsa, L.; Timmer, M.; Somogyi, T.; Feher, J. (Natl. Inst. Traumatology, Budapest, Hungary). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):344-347; 1978.

Clinical and biochemical findings indicative of liver damage are reported in association with early syphilis. Of 175 patients with early untreated syphilis, 25 had laboratory tests indicative of hepatic damage (increased serum bilirubin levels, increased ESR, positive colloid lability, increased SGPT and SGOT activity, abnormal prothrombin time and BSP value, altered serum protein and Ig levels). Light microscopy of biopsy material from the 25 patients showed slight or severe liver damage in 23 cases. There was proliferation of endothelial and Kupffer cells; leukocyte and lymphocyte infiltration of the sinusoids, arteries, and veins; narrowing of the lumena of vessels; focal necrosis; destruction of the reticulin structure; periportal inflammation; and fibrosis. In 17 cases, treponemes were demonstrated in the biopsy. After 2 months of penicillin treatment, nearly all of these features had reversed and returned to normal. Four specimens were examined before treatment and two after treatment using electron microscopy. Reduced glycogen content was observed. The mitochondrial matrix contained abundant electrodense material. Lysosomes were increased in size and number. The endoplasmic reticulum was generally degranulated and tubularized. Intracellular edema and vacuolization were observed. Lipid vacuoles were occasionally seen. Treponemes were demonstrated. These changes reversed after penicillin therapy. It is concluded that in some cases of syphilis, a characteristic hepatitis occurs at an early stage of the disease.

7115 CONGENITAL SYPHILITIC HEPATITIS: A RADIONUCLIDE STUDY. (Eng.) Gates, G. F.; Stanley, P.; Gwinn, J. L.; Miller, J. H. (Children's Hosp., 4650 Sunset Blvd., Los Angeles, CA 90054). *Radiology* 128(1):163-164; 1978.

The case of a 2-month-old girl in whom congenital syphilitic hepatitis was discovered by skeletal roentgenography is presented. The patient had marked hepatosplenomegaly; an erythematous, desquamating rash on the thighs; anemia; and leukocytosis. The serum alkaline phosphatase level was 474 IU. Hepatic scintigraphy with ^{99m}Tc sulfur colloid showed no uptake in most of the liver, but there was marked splenic, bone marrow, and lung uptake. Skeletal radiographs showed periosteal elevation along the shafts of all the long bones and proximal tibial metaphyseal irregularities suggestive of congenital syphilis; this diagnosis was confirmed by a venereal disease research laboratories titer of 1:128 and a positive fluorescent treponemal antibody reaction. After a 10-day course of procaine penicillin, the liver and spleen sizes were decreased and there was improved liver uptake of radiocolloid with decreased spleen size, although bone marrow and lung accumulation persisted. A liver scan 6 months later was normal.

7116 INTRAHEPATIC CHOLESTASIS INDUCED BY DRUGS AND CHEMICALS. (Eng.) Plaa, G. L.; Priestly, B. G. (Faculte de Medecine, Universite de Montreal, C.P. 6128, Montreal, Quebec, Canada). *Pharmacol. Rev.* 28(3):207-273; 1977.

7117 PROTECTIVE EFFECTS OF NUTRITIONAL STATUS ON DRUG-INDUCED FATTY LIVER AND HEPATOCELLULAR NECROSIS [Abstract]. (Eng.) Sabesin, S. M.; Kinnard, M. S. (Univ. Tennessee Center Health Sciences, Memphis, TN). *Gastroenterology* 72(5, Part 2):1124; 1977.

7118 HEPATOTOXICITY OF COMBINATION CHEMOTHERAPY FOR ACUTE MYELOCYTIC LEUKEMIA [Letter to Editor]. (Eng.) Penta, J. S.; Von Hoff, D. D.; Muggia, F. M. (Natl. Cancer Inst., Bethesda, MD 20014). *Ann. Int. Med.* 87(2):247-248; 1977.

See also, 6922, 7085.

Acute Viral Hepatitis

7119 A NEW HUMAN HEPATITIS VIRUS. (Eng.)

Zuckerman, A. J. (London Sch. Hygiene and Tropical Medicine, London, England). *Nature* 271 (5641):113-114; 1978.

Evidence for the existence of a third type of human viral hepatitis is reviewed. The identification of specific viral antigenic markers of hepatitis A (HA) and hepatitis B (HB) permits specific diagnosis and has lead to the recognition of a third form of hepatitis unrelated to either HA or HB, referred to in the United States as non A, non B hepatitis (NANBH). NANBH is now the most common form of hepatitis occurring after blood transfusion in some areas of the world. Serum samples from five blood donors implicated in the transmission of post-transfusion hepatitis, which had been stored frozen since the 1950s, were tested; two of the donor sera contained HB virus and transmitted HB to all susceptible recipients, two of whom developed hepatic coma. The remaining three sera did not contain HB markers but nevertheless transmitted a form of hepatitis to nine volunteer recipients that could not be attributed to HA virus (HAV), HB virus (HBV), cytomegalovirus, or Epstein-Barr virus (EBV). The incubation period ranged from 18-89 days, and the clinical illness was similar to HB. Two volunteers developed evidence of persistent liver damage. In a separate study, 16 of 44 patients with NANBH had persistent biochemical evidence of liver damage 6 months after the acute illness; in 10 patients, the abnormality persisted 1-3 yr, and liver biopsy revealed histological evidence of chronic liver damage. It was further observed that 9/22 patients who received placebo (albumin solution) developed evidence of chronic hepatitis, whereas only 1/11 who received normal Ig and 0/11 who received HB Ig did so. When the cause of acute hepatitis was investigated in 45 patients at one hospital, 20 had no laboratory evidence of infection with HAV, HBV, cytomegalovirus, or EBV. It was noted that in nearly half of these patients, the infection followed the type of exposure traditionally associated with HB infection. These reports suggest that (1) a carrier state of NANBH exists, (2) infection must be common since pooled Ig seems to contain prophylactic activity, and (3) this infection may progress to chronic liver disease. There is an urgent need to develop specific laboratory tests for identifying the virus or viruses involved.

7120 FULMINANT HEPATITIS: REVIEW OF 137 CASES. I. COMPLICATIONS. (Fre.)

Nusinovici, V.; Crubille, C.; Opolon, P.; Touboul, J. P.; Darnis, F.; Caroli, J. (Hopital Saint-Antoine, 184, rue du Faubourg-Saint-Antoine, F 75012 Paris, France). *Gastroenterol. Clin. Biol.* 1(11):861-873; 1977.

The principal complications in a series of 137 patients in grade IV coma resulting from fulminant hepatitis are discussed. The etiology of the hepatitis was viral in 85% of cases and drug related (especially isoniazid) in 8%. Upper digestive tract hemorrhages occurred in 39% of patients, with 48% of patients who received corticosteroids hemorrhaging, whereas only 27% of patients not treated with steroids hemorrhaged ($p<0.02$). Cerebral edema was difficult to demonstrate clinically, but was present in 24% of necropsied patients; treatment with furosamid and/or mannitol did not seem to improve the edema. Severe hyperlactatemia with acidosis and hypocapnia was seen in 9% of the patients; its evolution was always fatal. Hyperamylasemia was present in 53% of the patients. In 19% of necropsied patients, macroscopic pancreatic lesions could be observed. Plasmatic and globular hypovolemia, which was refractive to transfusions, was present in 47% of the patients. Proteinuria (>0.50 g/24 hr) was observed in 30% of the patients. Creatinemia >15 mg/l was found in 26/35 patients tested; all of these died, whereas 7/9 patients with creatinine of <15 mg/l survived. Septicemia developed in 20% of patients and it was fatal in 6%. Overall mortality was 82.5% in spite of symptomatic treatment (maintenance of hydroelectrolytic and volumetric equilibrium, assisted ventilation, total transfusions, and the administration of human albumin, furosamid, lactulose, and anticonvulsants) and curative treatment (corticotherapy, hemodialysis, perfusions with coenzyme A, and administration of plasma rich in anti-HBs antibodies).

7121 FULMINANT HEPATITIS WITH COMA: A REVIEW OF 137 CASES. II. COURSE AND PROGNOSIS.

(Fre.) Nusinovici, V.; Crubille, C.; Opolon, P.; Touboul, J. P.; Darnis, F.; Caroli, J. (Hopital Saint-Antoine, 184, rue du Faubourg-Saint-Antoine, F 75012 Paris, France). *Gastroenterol. Clin. Biol.* 1(11):875-886; 1977.

Experience with 137 cases of fulminant hepatitis is reviewed. Fulminant hepatitis led to death in 82.5% of the cases. Etiology did not influence the outcome of the disease. Of statistical significance in predicting the prognosis were age (average age of the 24 survivors was 29 ± 11 versus 38 ± 16 in the 113 fatalities, $p<0.02$), depth of coma ($p<0.001$), convulsions ($p<0.01$), gastrointestinal bleeding ($p<0.001$), creatinemia (14 ± 5 mg/l in survivors versus 38 ± 26 mg/l in fatalities, $p<0.02$), urinary urea (20 ± 12 g/24 hr versus 12 ± 9 g/24 hr, resp., $p<0.01$), hypocapnia ($p<0.05$), galactose clearance ($p<0.05$), prothrombin time ($p<0.02$), factor V level ($p<0.001$), fibrinogen level ($p<0.02$), ethanol test ($p<0.05$), von Kaulla's test ($p<0.01$), and hepatocyte volume ($p<0.05$). The principal causes of death were decerebration (50%), hemorrhage (17.6%), cardiovascular collapse (11.5%), and sepsis (6%). Hepatic regeneration was present in 17 patients at the time of death, but the causes of death in these patients did not differ significantly from those of other patients. When patients received hemodialysis with a polyacrylonitrile membrane, they regained consciousness significantly more often than did nondialyzed patients (6/13 vs 5/96, $p<0.001$). In the latter patients, transient consciousness was always accompanied by liver regeneration. Hemodialyzed patients also lived longer in a coma than did nondialyzed patients (7.6 ± 6 days versus 3.9 ± 2.6 days, $p<0.02$). The overall survival rate was only 17.5% and was not influenced by the type of treatment. Of the 24 survivors, 21 were completely healed after a few months, 1 had chronic hepatitis, and 1 had acute chronic hepatitis.

7122 HEPATITIS IN CLINICAL LABORATORIES 1975-76. (Eng.) Grist, N. R. (Ruchill Hosp., Glasgow G20 9NB, England). *J. Clin. Pathol.* 31(5): 415-417; 1978.

The survey of British laboratories in 1970-74 was continued by a questionnaire to members of the Association of Clinical Pathologists covering the next 2 yr. Only nine cases of hepatitis (3 of hepatitis B) were reported in a total of 223 laboratories. The annual attack rate of 34 per 100,000 was only one-fourth that reported in the previous 2 yr. No laboratory reported more than a single case, and an analysis of the characteristics and work patterns of the laboratories showed no special association with hepatitis. The dramatic fall in the attack rate of hepatitis since the previous study, and in particular of hepatitis B, suggests that the strenuous and expensive efforts in recent years to prevent laboratory-acquired hepatitis in Britain have had considerable success.

7123 HEPATITIS: THE PLIGHT OF THE CARRIER. (Eng.) Blumberg, B. S. (Univ. Pennsylvania, Philadelphia, PA). *Sciences* 8(3):10-11, 30; 1978.

The social consequences of the existence of simple routine tests for the detection of hepatitis B surface antigen (HBsAg) carriers are discussed. The carrier state is usually detected in an asymptomatic individual whose serum is tested for routine blood donation. The carrier is unique in that he is asymptomatic but may unwittingly cause illness in others. It is not known how many carriers can transmit hepatitis by means other than transfusion; although there are cases of this type, they appear to be rare. Some evidence has suggested that carriers who have evidence of ongoing liver disease or who have the e antigen are more likely to transmit the disease. Problems faced by health care personnel, Vietnam veterans, and orphaned Vietnamese children brought to the United States who are carriers are discussed. The value of taking measures to isolate these carriers is questioned: should one group of carriers be stigmatized while others are not, just because it is easy to unmask them?

7124 THE RISK OF HEPATITIS B TO HOSPITAL PERSONNEL: A PROSPECTIVE STUDY AMONG PERSONNEL EXPOSED TO PATIENTS WITHOUT ISOLATION PRECAUTION. (Eng.) Wickliffe, C. W.; Galambos, J. T.; Rivers, S.; Blitch, L. (Emory Univ. Sch. Medicine, 69 Butler St. S.E., Atlanta, GA 30303). *Am. J. Dig. Dis.* 23(4):293-296; 1978.

A study was undertaken to determine prospectively the probability of developing clinical or serological evidence of hepatitis B virus infection among ward personnel involved in the care of hepatitis B patients where no specific isolation precautions were in use other than separate collection of hypodermic needles and no parenteral exposure occurred. During a 2-week period, 54 ward personnel were exposed to 2 patients with severe type B hepatitis, one with fulminant hepatitis who died on the fifth hospital day and one with grade 2 encephalopathy who was on the ward for 10 days. Both patients were hepatitis B surface antigen (HBsAg)-positive. The 54 subjects were categorized by exposure to the 2 patients: group A, physcial contact with the index cases >3 times (n=15); group B, physical contact <3 times (n=15); group C, physical contact with containers of blood, feces, urine, or saliva from index cases (n=11); and group D, no physical contact, but on the ward with index cases (n=13). Clinically recognizable hepatitis did not develop among the 54 subjects during 22 weeks of follow-up; all remained negative for HBsAg. Two from group B and two from group D developed mild transient SGPT elevations; antibody to HBs (anti-HBs) was negative in all four subjects. Anti-HBs was demonstrated in 7/54 subjects (3 in group B, 1 in group C, and 3 in group D); 5/7 had been anti-HBs-positive initially (at 1 week), whereas 2 became positive later (at 3 and at 13 weeks). This study indicates that ward personnel who care for patients with type B hepatitis are not at an increased risk of infection when specific isolation procedures are not used.

7125 HEPATITIS B: ABSENCE OF TRANSMISSION BY GASTROINTESTINAL ENDOSCOPY. (Eng.) McClelland, D. B. L.; Burrell, C. J.; Tonkin, R. W.; Heading, R. C. (Royal Infirmary, Edinburgh, Scotland). *Br. Med. J.* 1(6104):23-24; 1978.

To evaluate the risk of transmitting hepatitis B via a contaminated endoscope, 37 of 38 patients examined with the same instrument after it was used to examine a man with persistent hepatitis B (HB) antigenemia were followed up. The index patient was HB surface antigen (HBsAg)- and HBeAg-positive at the time of his endoscopy, but the discovery was made too late to prevent the further use of the instrument for 15 days. Between examinations, the instrument was cleaned only with water, chlorhexidine, and cetrimide. Sera from 37 patients were obtained 2-104 days after endoscopy and were all HBsAg- and HBeAg-negative; 2 were positive for antibody to HBsAg (anti-HBs). Thirty patients were retested at 162-225 days with no antigenemia detected and no change in antibody titers found. Using an ^{125}I-HBsAg marker, contamination of instruments was simulated, and washing procedures usually employed were followed; it was possible to recover the marker from the instruments after the routine cleaning. The coiled outer cover of the forceps was a particularly important trap for contaminated material. Although the results suggest that this mode of transmission of HB is rare, additional precautions are suggested for decontaminating instruments. Known HBsAg carriers should be examined with separate instruments for which there are separate precautions.

7126 A CASE OF HEPATITIS B WITH PLEURAL EFFUSION. (Eng.) Flacks, L. M.; Lees, D. (Rotorua Hosp., Rotorua, New Zealand). *Aust. N.Z. J. Med.* 7(6):636-637; 1977.

A case of viral hepatitis B with associated large pleural effusion is reported. The patient was a 26-yr-old man. Pleuritic pain and effusion developed on day 6 of his illness; jaundice was observed on day 9. Increased awareness of the association between viral hepatitis and pleural effusion seems to be of clinical importance and may contribute to knowledge of autoimmune phenomena and the part they play in the interrelationship of certain diseases.

7127 HEPATITIS IN HEMODIALYSIS PATIENTS: SIGNIFICANCE OF HBeAg. (Eng.) Miller, D. J.; Williams, A. E.; Le Bouvier, G. L.; Dwyer, J. M.; Grant, J.; Klatskin, G. (Yale Univ., Sch. Medicine, 333 Cedar St., New Haven, CT 06510). *Gastroenterology* 74(6):1208-1213; 1978.

Twenty-four hepatitis B surface antigen (HBsAg)-positive (HBsAg$^+$) hemodialysis patients were prospectively studied to assess (1) the prognostic value of hepatitis B e antigen (HBeAg) and its HBe$_1$Ag and HBe$_2$Ag components and (2) whether a difference in cellular immune status between HBeAg$^+$ and HBeAg$^-$ negative (HBeAg$^-$) patients could be defined. Sixteen patients were HBeAg$^+$ and eight were HBeAg$^-$ initially. After a mean follow-up period of 23.7 months, 15 of the 16 HBeAg$^+$ patients were still HBsAg$^+$ at death or last follow-up, whereas 7 of the 8 HBeAg$^-$ patients had become HBsAg$^-$ at a mean period of 3.8 months. This finding indicates that the initial presence of HBeAg correlates with HBsAg persistence. HBe$_1$Ag was consistently present in 15 of the 16 patients when HBeAg was detectable, whereas HBe$_2$Ag fluctuated widely in individual patients over time. No difference in cellular immune status between HBeAg$^+$ and HBeAg$^-$ patients could be defined; although both HBeAg$^+$ and HBeAg$^-$ patients had a similar decrease in peripheral blood thymus-derived cells and poor responsiveness to purified HBsAg, both groups of patients had stimulation indices to nonspecific mitogens within the normal range.

7128 CYTOMEGALOVIRUS HEPATITIS (DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS). (Eng.) Groza, S. (Faculty Medicine, Univ. Belgrade, Belgrade, Yugoslavia). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):340-343; 1978.

The diagnosis and differential diagnosis of cytomegalovirus (CMV) hepatitis is considered. A 12-yr-old girl presented with fever, nausea, and vomiting. Her sclerae were subicteric, the glands in her neck were mildly enlarged, and she had predominantly mononuclear cells in the peripheral blood. Biochemical analyses did not indicate hepatitis A. The patient's sclerae cleared on the third hospital day, and she became afebrile; there were no complications and the disease had a mild course. Histological analysis revealed viral hepatitis in an advanced stage. Virological examination of the patient's serum confirmed the CMV etiology of the disease. An accurate diagnosis could not have been made without the virological results.

7129 SERUM BILE ACIDS IN PATIENTS WITH VIRAL HEPATITIS. (Eng.) Pennington, C. R.; Ross, P. E.; Bouchier, I. A. D. (Ninewells Hosp. and Medical Sch., Dundee, Scotland). *Scand. J. Gastroenterol.* 13(1):77-80; 1978.

To evaluate the changes in the total and individual bile acids in patients with viral hepatitis, fasting blood samples were obtained from 18 patients when they were first seen. In 9/18 patients (group A) who were seen within 2 weeks of the onset of symptoms, fasting serum was also obtained at weekly intervals for 2 more weeks. In 8/18 patients (group B) postprandial serum bile acids were estimated during convalescence every 2 weeks until liver function tests had returned to normal. Total serum bile acid values for the 18 patients were 42.9-452 μM (normal maximum is 4.5 μM), which values correlated with the serum bilirubin levels ($r=0.63$, $p<0.005$) but not with the aspartate aminotransferase (AAT) levels. Cholic (C), chenodeoxycholic (CD), and deoxycholic (D) acids were the major bile acids in the 18 patients; their proportions were variable (e.g., C:CD was 0.19-1.91); D accounted for only 5.1% of the total compared to 26.1% in control subjects ($p<0.001$). In group A, the C:CD ratio tended to increase with time, as C replaced CD in predominance as the disease resolved. When compared to the levels of bilirubin, AAT, and γ-glutamyl-transpeptidase, the levels of postprandial serum bile acids returned to the normal range at varying times. It is concluded that the measurement of serum bile acids does not provide added information of value in the management of patients with viral hepatitis.

7130 SERUM MYOINOSITOL AND PHOSPHATIDYLINOSITOL IN PATIENTS WITH VIRAL HEPATITIS. (Pol.) Tkaczewski, W.; Tkacz, B.; Lutz, W.; Szeszko, A.; Dworniak, D.; Drobnik, S. (Instytut Medycyny Wewnetrznej WAM, ul. Kniaziewicza 1/5, 91-347 Lodz, Poland). *Pol. Tyg. Lek.* 32(49):1913-1915; 1977.

The serum concentrations of myoinositol, phosphatidylinositol, cholesterol, and total phospholipids as well as the serum alanine aminotransferase activity were determined in 17 patients with serum hepatitis during the 1st, 2nd, 3rd, and 4th weeks of the disease. The myoinositol levels were 51.6 ± 10.7 μM during the 1st week ($p<0.001$) and 34.9 ± 8.2 μM during the 2nd week ($p<0.02$) versus a normal value of 21.5 ± 5.5 μM. There was no significant difference during the 3rd and 4th weeks. The phosphatidylinositol levels were 126 ± 21 µM during the 1st week ($p<0.001$), 153 ± 24 µM ($p<0.001$) during the 2nd week, 186 ± 35 µM ($p<0.005$) during the 3rd week, and 199 ± 36 µM ($p<0.01$) during the 4th week, compared with a normal level of 255 ± 42 µM. The cholesterol and total phospholipid levels did not show any significant change from the respective normal values. The alanine aminotransferase activity dropped sharply from the 1st to the 4th week.

7131 SEROCONVERSION FROM HEPATITIS B e ANTIGEN TO ANTI-HBe IN ACUTE HEPATITIS B VIRUS INFECTION. (Eng.) Aikawa, T.; Sairenji, H.; Furuta, S.; Kiyosawa, K.; Shikata, T.; Imai, M.; *et al.* (Mito Natl. Hosp., Ibaraki-ken, Tokyo, Japan). *N. Engl. J. Med.* 298(8):439-441; 1978.

To study the temporal course of hepatitis B e antigen (HBeAg) and antibody to it (anti-HBe), a recently developed sensitive passive hemagglutination assay was used to investigate sera from persons at high risk of HB infection and from a chimpanzee with experimental HB infection. HB was diagnosed in seven members of the medical staffs of two laboratories conducting research with HB virus, and a chimpanzee was inoculated with 0.1 µl of pooled plasma from HB carriers containing both HBeAg-associated and HB surface Ag (HBsAg)-associated DNA polymerase activity. HBeAg was present (titer 2^3-2^{10}) in all sera as long as HBsAg was present. After recovery from hepatitis, anti-HBe developed in the sera of three patients and of the chimpanzee but was not found in the remaining sera during 10 weeks of follow-up. Antibody to HBsAg (anti-HBs) developed in six patients and the chimpanzee; antibody to HB core antigen (anti-HBc) developed in all sera. All subtypes of HBsAg were present and bore no relation to the appearance of HBeAg. The time courses for the antigens and antibodies in one patient and the chimpanzee are given. It is possible that the seroconversion to anti-HBe could have occurred at a level below the lower limit of the detection method in the four patients not found to become anti-HBe-positive. However, seroconversion to anti-HBe does occur in acute HB infection.

7132 IgA DYSGAMMAGLOBULINEMIA IN LIVER DISEASES. (Cze.) Svejda, J.; Richter, J. (Infekcni oddeleni, Krajska nemocnice s poliklinikou KUNZ, tr. SNP 18, 400 11 Usti nad Labem, Czechoslovakia). *Cas. Lek. Cesk.* 117(4):111-114; 1978.

Various dysgammaglobulinemias were found in 28/282 patients with viral hepatitis and diseases of the gallbladder and bile ducts. IgG dysgammaglobulinemia was found in one patient with hepatitis A and another with hepatitis B. IgA dysgammaglobulinemia was found in two patients with hepatitis A and in two patients with hepatitis B. IgM dysgammaglobulinemia was found in 2 patients with hepatitis A, in 9 patients with hepatitis B, and in 10 patients with diseases of the gallbladder and bile ducts. IgG paraprotein was found in one patient with hepatitis B. The IgA levels were 0.004-0.370 IU/ml in three of the four patients with IgA dysgammaglobulinemia 12-24 months after viral hepatitis and were absent in the fourth patient. The conspicuously high incidence of dysgammaglobulinemias is interpreted as a sign of predisposition among patients with this condition to viral hepatitis and diseases of the gallbladder and bile ducts.

7133 HEPATITIS IN EARLY SYPHILIS: REPORT OF THREE CASES. (Eng.) McMillan, A.; Anderson, J. R.; Robertson, D. H. H. (Royal Infirmary, Edinburgh EH3 9YW, Scotland). *Br. J. Vener. Dis.* 53(5):295-298; 1977.

The cases of three patients with early syphilis and liver dysfunction, none of whom was known to have had contact with hepatitis, are presented. Two patients had had several homosexual contacts, but neither hepatitis B antigen nor antibody was detected in their sera. The first patient, a 38-yr-old man, presented with pruritus, nausea, dark urine, and scleral icterus. He had been examined 2 months earlier for syphilis, but his Venereal Diseases Research Laboratory (VDRL) and *Treponema pallidum* hemagglutination (TPHA) tests were negative. The patient had abnormal liver function tests and hepatomegaly. There was no evidence of a healed primary lesion or a rash, but the VDRL titer was positive at 1:8, and the TPHA titer was positive at 1:80; the fluorescent treponemal antibody absorption (FTA-ABS) test was also positive. Four days later, he developed a maculopapular rash. One week following the start of penicillin therapy, the rash faded, and the jaundice disappeared after 2 weeks. The second patient presented with typical condylomata lata in the perianal region and a papulosquamous rash but no evidence of a healed primary lesion. Tests for syphilis were positive. He was not jaundiced, but the liver enzymes were elevated. The liver function tests began to normalize 14 days after starting penicillin therapy and were normal 6 weeks later. The third patient, a 46-yr-old man, had a penile ulcer, no evidence of jaundice or mucocutaneous lesions of secondary syphilis, and no hepatomegaly. The liver function tests were abnormal. The patient was asymptomatic and liver function tests were normal 8 weeks after penicillin therapy. These cases emphasize the need to exclude syphilis when the liver function tests of a jaundiced patient do not conform to any well-defined pattern.

7134 HEPATITIS B IS NOT TRANSMITTED BY ORAL-FECAL ROUTE. (Fre.) Piazza, M.; Cacciatore, L.; Molinari, V.; Picciotto, L. (Faculty Medicine, Univ. Naples, via S. Pansini, Naples, Italy). *Nouv. Presse Med.* 6(29):2606-2607; 1977.

7135 PROGNOSTIC VALUE OF ISOENZYMES IN ACUTE HEPATITIS: LOADING TESTS. (Ger.) Baumgarten, R.; Klimmt, G.; Graubaum, H. J.; Wagenknecht, C. (Stadtisches Krankenhaus Prenzlauer Berg, Nordmarkstrasse 15, DDR-1055 Berlin, E. Germany). *Z. Gesamte Inn. Med.* 32(3):43-45; 1977.

7136 IMMUNOLOGICAL ASPECTS OF VIRAL HEPATITIS. (Ger.) Meyer zum Buschenfelde, K. H.; Arnold, W.; Hutteroth, T. H. (Klinikum Charlottenburg der Freien Universitat, Spandauer Damm 130, D-1000 Berlin 19, W. Germany). *Internist (Berlin)* 18(4):201-207; 1977.

7137 SERUM IMMUNOGLOBULIN LEVELS IN CHILDREN WITH VIRAL HEPATITIS. (Rus.) Makhmudova, O. S.; Mukhamedov, D. B. (Central Asiatic Inst. Pediatric Medicine, Tashkent, USSR). *Zh. Mikrobiol. Epidemiol. Immunobiol.* (8):140-141; 1977.

7138 COMPARATIVE STUDY OF ALPHA-FETOPROTEIN AND AUSTRALIA ANTIGEN IN VIRAL AND SERUM HEPATITIS IN YOUNG CHILDREN. (Rus.) Silishcheva, N. N.; Krivonosov, S. K.; Masenko, V. P.; Tatarinov, Iu. S. (Dept. Pediatrics, Astrakhan' Medical Inst., Astrakhan', USSR). *Pediatriia* (7):76-77; 1977.

7139 SEROLOGICAL SUBGROUPS OF HEPATITIS B SURFACE ANTIGEN (AUSTRALIA ANTIGEN) AND THEIR SIGNIFICANCE. (Hun.) Halmosdi, G.; Vallo, D.; Matkovics, A. (Vertransfusios Osztaly, Orvostovabbkepzo Intezet, Budapest, Hungary). *Orv. Hetil.* 118(36):2139-2143; 1977.

7140 SERUM DIGOXIN CONCENTRATION IN ACUTE HEPATITIS. (Hun.) Somogyi, G.; Gasztonyi, G.; Gachalyi, B.; Ibranyi, E. (II. Belgyogyaszati Klinika, Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary). *Orv. Hetil.* 119(3):131-132; 1978.

7141 THERAPEUTIC RESULTS WITH HEPSAN® IN SELECTED FORMS OF HEPATITIS. (Ger.) Schneider-Reinkens, A. (Homburger Landstrasse 112, D-6000 Frankfurt a. M. 50, W. Germany). *Munch. Med. Wochenschr.* 119(25):869-870; 1977.

7142 REPARATIVE PROCESSES IN THE LIVER IN VIRAL HEPATITIS. (Rus.) Kartashova, O. Ia; Saldava, L. A.; Zaltsmane, V. I.; Vandans, Ia. A. (Hepatology Center, Latvian SSR Ministry Public Health, Riga, USSR). *Arkh. Patol.* 38(8): 26-32; 1976.

7143 HEPATITIS B AND LIVER CANCER. (Fre.) Sankale, M. (Faculte de Medecine et de Pharmacie de Dakar, Dakar, Senegal). *Bull. Acad. Natl. Med. (Paris)* 161(6):492-495; 1977.

See also, 6780, 6978, 7067, 7152, 7193.

LIVER AND BILIARY TRACT

Chronic Hepatitis

7144 ISOENZYMES OF ASPARTATE AMINOTRANSFERASE IN CHRONIC LIVER DISEASES. (Eng.) Skrha, J.; Stepan, J.; Volek, V. (Faculty Medicine, Charles Univ., U nemocnice 1, 128 21 Prague 2, Czechoslovakia). *Acta Hepatogastroenterol. (Stuttg.)* 25 (2):127-129; 1978.

To evaluate the importance of aspartate amino transferase (AST) isoenzymes (cytoplasmic and mitochondrial) in liver diseases, the plasma levels of these isoenzymes were studied in 27 patients with chronic hepatitis, 23 with liver cirrhosis, 6 with focal liver tumors, and in 34 healthy controls. The patients were further divided as having biochemically active hepatitis (9) or cirrhosis (18) or stabilized hepatitis (12) or cirrhosis (6). The patients with active hepatitis or cirrhosis and with neoplasms had significantly higher total AST activity, cytoplasmic AST isozyme activity, and mitochondrial AST isoenzyme activity as compared with controls ($p < 0.005$), whereas those with stabilized hepatitis or cirrhosis had AST values similar to those of contro In particular, the mitochondrial AST levels in patients with neoplasms were markedly elevated. Thes results indicate the usefulness of mitochondrial AS determinations in estimating the depth of structura liver damage and the stability of a liver disease process.

7145 EFFECT OF VIDARABINE ON CHRONIC HEPATITIS B VIRUS INFECTION. (Eng.) Pollard, R. B.; Smith, J. L.; Neal, E. A.; Gregory, P. B.; Merigan, T. C.; Robinson, W. S. (Stanford Univ. Medical Center, Stanford, CA 94305). *JAMA* 239(16):1648-1650; 1978.

To evaluate the effect of vidarabine (adenosine arabinoside) on Dane particle markers in hepatitis B virus (HBV) infection, two patients with chronic hepatitis and HBV infection were studied. Both patients received two courses of vidarabine of 15 mg/kg/day for 9-14 days separated by an interval of 7 weeks in one patient and 20 days in the other. In the first patient, Dane particle DNA polymerase activity decreased markedly during each course and rose sharply when vidarabine therapy was stopped; in the second patient, the DNA polymerase activity fell to undetectable levels by day 8 of course one, rose somewhat in the interval, then fell again to undetectable levels during the second course and has remained undetectable for 12 months. No significant change occurred in the hepatitis B surface antigen (HBsAg) complement fixation titer in the first patient, but in the second patient, the titer fell from 1:256 to <1:8 and remained at this level for 12 months after therapy. The hepatitis B core antigen (HBcAg) level was transiently decreased in the first patient but became undetectable in the second patient after the second course. Mild transient suppression of granulocytes, reticulocytes, and platelets occurred in both patients during therapy. The first patient experienced nausea, anorexia, and constipation. The second patient had mild abdominal cramping during the first course of treatment that recurred with nausea and more notable cramping pain during the second course; since the patient was an insulin-dependent diabetic with autonomic neuropathy, the relative contribution of vidarabine to her signs and symptoms is uncertain. No consistent changes in liver function tests were observed in either patient. The reason for the differential response of the two patients is unknown. The results suggest that the replication of HBV may be inhibited by vidarabine, but the side-effects of this drug indicate that further study is required before it is used in therapy for HBV infection.

7146 PROGNOSTIC VALUE OF HBeAg IN CHRONIC PERSISTENT HEPATITIS. (Eng.) Pastore, G.; Dentico, P.; Fera, G.; Schiraldi, O. (Clinica Malattie Infettive Universita di Bari, Policlinico, 70124 Bari, Italy). *Br. Med. J.* 2(6101):1521; 1977.

The relationship between the hepatitis B e antigen/antibody (HBeAg/anti-HBe) system and the prognosis was studied in 35 patients with hepatitis B surface antigen (HBsAg) and antibody (anti-HBs)-positive chronic progressive hepatitis. Twelve patients, four of whom carried anti-HBe and two HBeAg, showed biochemical and histological resolution of liver disease over 12 months. The two patients with HBeAg lost the antigen after 6 and 7 months, resp. Fifteen patients showed no change during a mean of 24 months' observation. Five were anti-HBe carriers and six were HBeAg carriers. Only two of these six lost their initial HBeAg positivity despite persistence of HBsAg. Eight patients developed chronic aggressive hepatitis (6 cases) or cirrhosis (2) within 6 months to 3 yr. All eight had HBeAg in their serum, and only one showed seroconversion of HBeAg positivity. These data suggest that the loss of HBeAg in chronic progressive hepatitis may be an important prognostic sign indicating resolution of the illness. Persistence of HBeAg may be associated with an impaired immune response to the hepatitis B virus.

7147 CHRONIC ACTIVE HEPATITIS AND MEMBRANEOUS GLOMERULONEPHRITIS. (Eng.) Cogan, M. C.; Graber, M. L.; Connor, D. G. (Dept. Medicine, 1065 HSE, Univ. Southern California, San Francisco, CA 94143). *Am. J. Gastroenterol.* 68(4):386-391; 1977.

The case of a 26-yr-old man with hepatitis B surface antigen (HBsAg) in his serum for 5 yr who developed the nephrotic syndrome is presented. He was referred for evaluation due to increasing edema. His SGOT and SGPT were elevated (150 mU/ml and 62 mU/ml, resp.), the 24-hr urinary protein excretion was 3 g of which 77% was albumin, and the serum albumin was 2.8 g%. A percutaneous renal biopsy showed classic changes of membraneous glomerulonephritis (GN) with basement membrane thickening and "spikes" on silver methenamine staining. Electron microscopy showed large intramembraneous electron-dense deposits and podocyte "fusion." Immunofluorescent examination revealed a granular distribution of IgG and complement component C3 in the glomeruli and IgA in the interstitium. Indirect immunofluorescence showed HBsAg in a granular distribution in the glomeruli. A liver biopsy showed chronic active hepatitis (CAH) with widening of the portal tracts by mononuclear cell infiltrates, piecemeal necrosis of limiting plates, and focal bridging without cirrhosis. Prednisone therapy (100-120 mg every other day) brought the SGOT to 50 mU/ml after 4 months, but the hypoalbuminemia and proteinuria remained. The finding of HBsAg deposition in the glomerulus supports the pathogenic relation of the antigenemia to the renal disease.

7148 A CASE OF CHRONIC ACTIVE HEPATITIS WITH ANTIMICROSOMAL AND ANTINUCLEAR ANTIBODIES. (Ita.) Marchesini, G.; Masi, M.; Paolucci, P.; Franceschi, C.; Perocco, P.; Zauli, D. (Universita di Bologna, Istituto di Patologia Speciale Medica, Bologna, Italy). *Minerva Pediatr.* 29(12):827-832; 1977.

7149 ANTI-MEASLES AND ANTI-RUBELLA HEMAGGLUTINATION INHIBITING ANTIBODIES IN A GROUP OF CHILDREN WITH CHRONIC HEPATITIS. (Ita.) Jannuzzi, C.; Campelli, A.; Fabbri, A. (II Cattedra di Malattie Infettive dell'Universita, Via 5 Maggio, 39-16145 Genoa, Italy). *Boll. Ist. Sieroter. Milan.* 55(6):519-523; 1976.

7150 BIOCHEMICAL INVESTIGATION OF THE BILE IN CHRONIC HEPATITIS AND LIVER CIRRHOSIS.

(Rus.) Ivanov, A. I.; Radchenko, V. G. (Second Dept. Therapy, S. M. Kirov Military Medical Acad., Leningrad, USSR). *Ter. Arkh.* 49(2):60-64; 1977.

See also, 7067, 7121, 7141, 7160, 7162.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

7151 EPIDEMIOLOGICAL ASPECTS OF ALCOHOLIC LIVER CIRRHOSIS IN MEXICO.

(Spa.) Dajer, F.; Guevara, L.; Arosamena, L.; Suarez, G. I.; Kershenobich, D. (Instituto Nacional de la Nutricion, Av San Fernando y Viaducto Tlalpan, Mexico 22, D.F., Mexico). *Rev. Invest. Clin.* 30(1):13-28; 1978.

The epidemiology of alcoholic liver cirrhosis was studied in Mexico in a series of 2,394 cirrhotic patients during the period 1947-1975. Alcoholic liver cirrhosis was diagnosed in 55.7% of the patients, posthepatitic cirrhosis in 36.6%, cryptogenic cirrhosis in 5.8%, and other forms of cirrhosis in 1.9%. Men accounted for 93.75% of the patients with alcoholic liver cirrhosis. Nearly 80% of the patients had the first clinical manifestation of cirrhosis between the ages of 31 and 60 yr; alcoholic liver cirrhosis was diagnosed during the first year after the onset of the symptoms in 59.8% of the patients. The age at which the patients started drinking ranged from 3 to 63 yr. Seventy-eight percent of the patients were heavy daily drinkers. The alcohol was generally consumed directly with meals. The 1-yr and 5-yr survival rates were 73.7% and 55.8%, resp. Hepatic insufficiency directly related to alcoholic liver cirrhosis and/or its complications, including hepatic coma and acute anemia due to hemorrhage from the digestive tract, was the cause of 88% of all deaths.

7152 HIGH PREVALENCE OF HEPATITIS B VIRUS INFECTION AMONG HEAVY ALCOHOL DRINKERS IN JAPAN.

(Eng.) Naito, K.; Tsuji, T.; Nozaki, H.; Nagashima, H. (Okayama Univ. Medical Sch., 2-5-1 Shikata-cho, Okayama 700, Japan). *Microbiol. Immunol.* 21(12):735-738; 1978.

To clarify the pathogenesis of cirrhosis and chronic hepatitis in alcoholics, the prevalence of hepatitis B surface antigen (HBsAg), antibody to HBsAg (anti-HBs), and antibody to hepatitis B core antigen (anti-HBc) was examined in the sera of inhabitants of a district of Japan where alcohol drinking is popular and in controls. A group of 695 individuals from one city included 21 alcoholics (intake of >80 g ethanol/day for ≥5 yr), 421 nondrinkers, and 253 children (ages 3-12 yr). In addition, 675 individuals from a different city and 42,588 blood donors from this region were also studied. The frequency of HBsAg carriers did not differ significantly among these groups. The frequency of anti-HBs was 42.9% in the alcoholics, 21.1% in the nondrinkers, 5.1% in the children, 18.1% in the group from a different city, and 14.3% among 200 randomly selected blood donors from the larger group; the alcoholics differed significantly ($p<0.05$) from all the control groups. The alcoholics were 71.4% anti-HBc-positive, a rate significantly different ($p<0.05$) from the rates among the nondrinkers (43.0%), children (11.1%), or 200 blood donors (28.6%). The alcoholics also differed significantly ($p<0.05$) with respect to SGPT values. Alcoholics may be more accessible to hepatitis B virus (HBV), either through direct contact with infected individuals or because of impaired immunity. Alternatively, HBV may persist in minute quantities in the bodies of alcoholics, leading to increased antibody synthesis. It may also be that reinfection by HBV among alcoholics has a booster effect on antibody production. HBV appears to be closely related to the progression from alcoholic liver injury to cirrhosis.

7153 MITOCHONDRIAL ENZYME ACTIVITIES IN LIVER BIOPSIES FROM PATIENTS WITH ALCOHOLIC LIVER DISEASE.

(Eng.) Jenkins, W. J.; Peters, T. J. (Royal Postgraduate Medical Sch., London W12 OHS, England). *Gut* 19(5):341-344; 1978.

The hypothesis that mitochondrial damage is a significant factor in the pathogenesis of alcoholic liver disease (ALD) was investigated by enzymic analysis of mitochondrial fractions isolated from needle biopsy specimens from 13 control patients, 14 patients with fatty liver due to chronic alcoholism, and from 6 patients with other forms of liver disease. Enzymes associated with the inner and outer mitochondrial membranes (monoamine oxidase, succinic dehydrogenase, and cytochrome c oxidase) showed normal levels in ALD. Enzymes associated with the mitochondrial matrix (glutamate dehydrogenase, malate dehydrogenase, and aspartate aminotransferase) showed significantly raised levels in ALD compared with those in normal controls ($p<0.01$, $p<0.05$, and $p<0.02$, resp.), but the levels in patients with nonalcoholic liver disease were nor-al. In addition, analysis of the mitochondria by ucrose density gradient centrifugation revealed no ifferences between control tissue and liver from atients with alcoholic liver disease. These re- ults do not indicate that there is significant itochondrial damage in ALD. The raised levels of itochondrial matrix enzymes may represent an adap- ive response to the ethanol load.

154 STUDY OF PLASMA RENIN ACTIVITY DURING THE REINJECTION OF CONCENTRATED ASCITES IN IRRHOSIS [Abstract]. (Fre.) Hueber, D.; Levy, V. . (Hopital Saint-Antoine, Paris, France). *Gastro- nterol. Clin. Biol.* 1(8/9):712; 1977.

155 ZIEVE'S SYNDROME. (Fle.) Rutgeerts, P.; De Baere, H.; Hendrikx, A.; Fevery, J. A.Z. St.-Rafael, Leuven, Belgium). *Tijdschr. Gas- roenterol.* 19(2):136-148; 1976.

156 INEFFECTIVENESS OF PREDNISOLONE IN THE TREATMENT OF SERIOUS FORMS OF ACUTE LCOHOLIC HEPATITIS [Abstract]. (Fre.) Bories, P.; Lebrec, D.; Rueff, B.; Benhamou, J. P. (Hopital Beaujon, F 92110 Clichy, France). *Gastroenterol. Clin. Biol.* 1(8/9):706-707; 1977.

7157 BEER DRINKER'S CARDIOMYOPATHY: LIVER FAILURE, HYPONATRAEMIA, HYPO-OSMOLALITY, INAPPROPRIATE SECRETION OF ANTIDIURETIC HORMONE, LACTIC ACIDOSIS, VENOUS GANGRENE AND MYONEUROPATHY. (Eng.) Karthigasu, M. (New Cross Hosp., Wolverhampton WV10 0QP, England). *Proc. R. Soc. Med.* 70(8): 544-548; 1977.

See also, 6726, 6818, 6922, 7091, 7162.

LIVER AND BILIARY TRACT

Cirrhosis

158 TESTOSTERONE IN THE MANAGEMENT OF CIRRHOSIS OF THE LIVER--A CONTROLLED STUDY. Eng.) Puliyel, M. M.; Vyas, G. P.; Mehta, G. S. Benziger Hosp., Quilon 691001, India). *Aust. N.Z.* . *Med.* 7(6):596-599; 1977.

 improve the treatment of cirrhosis of the iver, a controlled trial of testosterone therapy as carried out in 21 patients randomly assigned a control group (group I) and a testos- erone group (group II). Group I and group II re- eived frusemide (40 mg i.v. daily for 3 days and hen daily with KCl supplements); group II also eceived testosterone (100 mg parenterally on al- ernate days for 4 weeks, then 300 mg fortnightly). 11 31 patients had histologically confirmed portal irrhosis; in group I, 4 had postnecrotic cirrhosis nd 5 had nutritional cirrhosis; in group II, 6 atients each had postnecrotic or nutritional cir- hosis. At the end of 4 weeks, there was a minimum eduction of 2.5 cm in the size of the spleen and n average reduction of 2.5 kg in weight in group I, whereas in group I, average weight increased y 2.6 kg. Abdominal girth showed a mean decrease f 4.8 cm in group II and a mean increase of 4.7 m in group I. Total serum protein rose 8.8% in roup II but only 1.7% in group I; serum albumin ose 34.6% in group II but fell 12.5% in group I p<0.05); serum globulin fell 12.5% in group II but ose 14.7% in group I ($p<0.05$). The value of thymol turbidity showed some deterioration in group I patients but showed a significant ($p<0.01$) improvement in group II cases. An increased appetite was reported by 75% of group II patients but by only 11% of group I patients. No histologic changes were observed over the course of the study when initial and final needle biopsies were compared. The adverse side-effects were noted in patients of either sex. These results confirm those in other studies concerning the value of testosterone therapy for liver cirrhosis.

7159 PLASMAPERFUSION FOR THE TREATMENT OF INTRACTABLE PRURITUS OF CHOLESTASIS. (Eng.) Lauterburg, B. H.; Pineda, A. A.; Dickson, E. R.; Baldus, W. P.; Taswell, H. F. (Mayo Graduate Sch. Medicine, Rochester, MN). *Mayo Clin. Proc.* 53(5): 403-407; 1978.

The case of a patient with primary biliary cirrhosis and intractable pruritus who was treated with plasmaperfusion of charcoal-coated glass beads on two occasions is presented. The procedures were well tolerated and resulted in the removal of about 70% (494 µmol) of the estimated chenic acid pool. There was pronounced amelioration of the pruritus, which enabled the patient to sleep through the night without awakening because of itching. The pruritus, however, did not disappear and gradually returned to its preperfusion intensity by the end of the third week after perfusion. This case demonstrates that plasmaperfusion of charcoal-coated glass beads is a safe technique that effectively removes bile acids and bilirubin.

7160 ON THE POSSIBLE RELATIONSHIP BETWEEN PLASMA CEA AND THE SEVERITY OF CIRRHOSIS.

(Eng.) Mor, C.; Gamba, G.; Moro, E.; Gennari, L.; Orefice, S.; Rocco, P.; *et al.* (Ospedale "S. Marta," Rivolta d'Adda, CR, Italy). *Rend. Gastroenterol.* 9(2):118-121; 1977.

Two hundred eight patients with non-neoplastic liver diseases were studied to determine if there is a relationship between the presence of carcinoembryonic antigen (CEA) and various humoral indices characterizing liver diseases and to ascertain whether the frequency of positive results is correlated with the severity of the disease. Radioimmunoassay for CEA gave positive results in 6 of the 29 patients with steatosis, in 10 of the 27 with chronic hepatitis, in 30 of the 84 with cirrhosis, in 1 of the 57 with biliary lithiasis, and in 9 of the 11 with acute hepatitis. In the cirrhotic patients, there was a significant correlation ($0.05 < p < 0.01$) between CEA-positive sera and several abnormal hematochemical indices (albumin, α_2-globulin, γ-globulin, indirect bilirubin, direct bilirubin, and prothrombin activity levels). The results suggest that a positive CEA test in cirrhosis is directly related to the severity of the disease.

7161 ALTERATION OF HAEM SYNTHESIS IN CIRRHOSIS OF THE LIVER.

(Eng.) Kautzsch, E. (Medizinische Abteilung im Stadtischen Krankenhaus, Oberfohringerstr. 156, D-8000 Munchen-Oberfohring 81, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):124-126; 1978.

To clarify disturbances of heme synthesis that occur in hepatic disorders, the levels of free protoporphyrins in RBC (EPP) were examined in 51 patients with liver cirrhosis (LC) and compared with values in 16 normal subjects, 14 patients with chronic fibrotic hepatitis (CFH), and 5 patients with chronic aggressive hepatitis. The LC patients fell into two groups. Group A (29 patients) had EPP values averaging close to the normal value (16.5 $\mu g/10^{11}$ RBC and 26.7 $\mu g/10^{11}$ RBC for group A and normals, resp.), whereas group B had markedly elevated EPP levels (44.2 $\mu g/10^{11}$ RBC) compared with normals. No relationship between EPP level and serum levels of SGOT, SGPT, bilirubin, iron, or protein was found in group A or B. The only consistent relationship was found between fat deposits in hepatocytes and EPP levels: a high level of one was always connected with a high level of the other. EPP levels in patients with CFH and CAH were 29.6 and 28.8 $\mu g/10^{11}$ RBC, resp. The increase in EPP level in LC may be due to a stimulating effect of a 5β-H-steroid metabolite on heme formation in the bone marrow or steroid metabolites involved in a feedback control mechanism may remain in the blood longer than is normal.

7162 IMMUNE COMPLEXES IN ACUTE AND CHRONIC LIVER DISEASE.

(Eng.) Thomas, H. C.; De Villiers, D.; Potter, B.; Hodgson, H.; Jain, S.; Jewell, D. P.; *et al.* (Royal Free Hosp., Pond St., Hampstead, London, England). *Clin. Exp. Immunol.* 31(2):150-157; 1978.

Sera from patients with acute type A and B viral hepatitis, paracetamol-induced necrosis, hepatitis B surface antigen (HBsAg)-positive and -negative chronic active and persistent hepatitis, various types of alcohol-induced liver injury, and primary biliary cirrhosis were examined for the presence of immune complexes, to investigate the possibility that the complexes found in HBsAg-negative chronic active hepatitis may result from liver damage and may also be present in other liver diseases. In acute type A hepatitis, a large increase in complement component Clq binding was demonstrated during the period of elevated levels of transaminases. In type B hepatitis, the initial peak was small but was followed by a further peak during the period of falling serum HBsAg. In both diseases, the Clq binding was associated with >20S particles. In paracetamol-induced necrosis, Clq binding remained normal. In type A and B hepatitis and in paracetamol-induced necrosis, C4, C3, and factor B concentrations were depressed in the early phase of the disease. This change may reflect either diminished synthesis or increased catabolism. In HBsAg-positive and -negative chronic active hepatitis and in alcohol-induced disease, there was a significant correlation between Clq binding and the severity of hepatitis. Clq binding and anticomplementary activity were also increased in primary biliary cirrhosis. Density gradient studies indicated that the Clq binding activity in these subjects lies in the 8-14S and >19S particle-containing fractions. These findings suggest the presence of immune complexes in patients with acute and chronic liver disease. In some cases, the complexes may contain hepatitis viral antigens, but in alcohol-induced and autoimmune disease, other types of complex formation must exist. The accumulation of large and small complexes in subjects with liver disease may be a reflection of an impaired function of the mononuclear phagocytes. The potential of these complexes to activate complement will determine their pathological importance, and in this respect, those found in primary biliary cirrhosis may have special significance.

7163 EVALUATION OF VOLATILE SULFUR COMPOUNDS IN THE EXPIRED ALVEOLAR GAS IN PATIENTS WITH LIVER CIRRHOSIS.

(Eng.) Kaji, H.; Hisamura, M.; Saito, N.; Murao, M. (Hokkaido Univ. Sch. Medicine, Nishi-7, Kita-15, Kita-ku, Sapporo 060, Japan). *Clin. Chim. Acta* 85(3):279-284; 1978.

To confirm the implication of methyl mercaptan and dimethyl sulfide reported in fetor hepaticus, fasting levels of these sulfur-containing compounds were determined by gas chromatography in the expired alveolar gas in 53 normal subjects, 13 patients with acute hepatitis, 11 patients with chronic hepatitis, 20 patients with liver cirrhosis, and 19 patients with stomach ulcer and/or undergoing gastric mucosal biopsy. The fasting level of dimethyl sulfide in the cirrhotics was 4.05 ± 1.06 ng/dl, which was a significant elevation in comparison with that in normal controls (1.54 ± 0.09 ng/dl, $p<0.05$). The dimethyl sulfide level in the cirrhotics was also significantly elevated in comparison with the levels in patients with acute hepatitis ($p<0.05$) and patients with ulcer and/or biopsy ($p<0.05$). In contrast, the methyl mercaptan levels were similar in all groups. Since there was no significant increase in sulfur-containing compounds in the patients with ulcer and/or biopsy, it appears that these compounds do not originate from gastrointestinal bleeding and are not produced by the activity of gastrointestinal microflora from sulfur-containing substrates. The physiological significance of these compounds in normal and pathologic states must be further studied.

7164 ABNORMAL VITAMIN D METABOLISM IN CIRRHOSIS.

(Eng.) Jung, R. T.; Davie, M.; unter, J. O.; Chalmers, T. M.; Lawson, D. E. M. Dunn Nutrition Lab. [MRC], Milton Rd., Cambridge, B4 1XJ, England). *Gut* 19(4):290-293; 1978.

o determine why low plasma 25-hydroxycholecalci- erol (25 OHD) values are found in liver cirrhosis, itamin D metabolism was investigated in 10 cir- hotic patients. The mean plasma 25 OHD concentra- ion in alcoholic cirrhosis was lower than that in ormal controls studied at the same time of year winter, 8.7 ± 3.99 versus 10.4 ± 3.8 ng/ml), but he difference was not significant. In three of our patients restudied in late summer, plasma 25 HD had risen. In contrast to the finding in normal ubjects, the half-life of i.v. administered ^{3}H- holecalciferol was short in cirrhotics and showed o correlation with plasma 25 OHD ($r=0.23$, $p=NS$), hereas half-life and plasma level of 25 OHD were orrelated in controls ($r=0.78$, $p<0.01$). Further- ore, the appearance of ^{3}H-25 OHD from ^{3}H-chole- alciferol was reduced compared to the control group hr after injection. An increased rate of chole- alciferol metabolism and deficient production of 5 OHD contribute to vitamin D deficiency in liver isease.

165 THE PORTAL TRIAD IN HEPATIC CIRRHOSIS.

(Eng.) Witte, C. L.; Witte, M. H.; mont, A. E. (Univ. Arizona Coll. Medicine, Tuc- on, AZ). *Surg. Gynecol. Obstet.* 146(6):965-974; 978.

o shed light on the triad of ascites, rupture of sophageal varices, and congestive splenomegaly in atients with cirrhosis, the origin and treatment this portal triad and its relation to portal ypertension are reviewed. Because critical events nfold in the relatively inaccessible hepatosplanchnic d, methodology has been a major stumbling block o obtaining detailed hemodynamic and lymphodynamic data. Direct measurement of organ blood flow usually is made under artificial or less than ideal conditions, for example, at laparotomy, quantitation of portasystemic collateral venous flow is indirect and at best a rough approximation; examination of lymph flow and composition in the thoracic duct and its major tributaries in the liver and extrahepatic portal bed is limited. However, a more comprehensive understanding of these phenomena is slowly emerging. Ascites begins with an imbalance of physiochemical forces at the capillary level in the liver and digestive tract. Large amounts of fluid are driven out of the vascular space into splanchnic tissues. When the rate of lymph return to the systemic venous circulation fails to keep pace with excessive capillary filtration, ascites appears. This situation leads to salt and water retention, involving the renin-aldosterone system. Plasma volume is restored, but at the same time hepatosplanchnic lymph formation is further enhanced, and a vicious circle is created. Treatment depends upon reduction of lymph formation by indirect, dietary restriction of salt and water and by diuretic drugs or by direct, portasystemic shunt, portal decompression or alternatively, upon acceleration of already rapid lymph return, by lymphvenous or peritoneovenous shunt, to match the high rate of lymph production. Spontaneous rupture of esophagogastric varices develops because of the precipitous rise in portal pressure when increased splanchnic blood flow combines with progressively rising portal vascular resistance. The greater the restriction to transhepatic portal venous flow, the less of an increment in splanchnic blood flow is required to generate pressures that ultimately exceed the bursting tension of thin-walled varices. Treatment is based on attempts to lower resistance to esophagogastric venous flow. Splenomegaly in patients with liver disease primarily derives from hepatocellular dysfunction with compensatory reticuloendothelial hyperactivity in the congested spleen. Splenic arterial flow increases as the demand for blood flow rises from splenic work hypertrophy, and peripheral cytopenias may develop. Treatment of symptomatic hypersplenism requires reduction of splenic mass either by restricting splenic arterial inflow or ablating the spleen.

7166 MANAGEMENT OF HEPATIC ASCITES.

(Eng.) Anonymous. (No affiliation given). *Lancet* 1(8059):311-312; 1978.

The management of hepatic ascites is reviewed. Reduction of serum colloid osmotic pressure (related to defective hepatic albumin synthesis) combined with portal hypertension due to obstruction are the principal causes. Intrasinusoidal pressure rises and causes hepatic lymph overproduction, and the kidney attempts to compensate for fluid loss into the peritoneum by conserving water and sodium. Basic treatment is restriction of dietary sodium and fluid intake together with a combination of sodium-losing and potassium-conserving diuretics. Over-diuresis is a danger, particularly potassium depletion and hepatic encephalopathy; diuresis-refractory patients may develop hepatorenal syndrome (functional renal failure). Large abdominal paracenteses are contraindicated except for diagnosis and urgent relief of painful, tense ascites. Reinfusion, either of unaltered ascitic fluid or of ultrafiltered fluid may bring relief in nonmalignant cases. A peritoneo-venous shunt has been developed that drains the peritoneal cavity via a tube into the internal or external jugular vein, using respiration as the force to open and shut a valve in the system. This technique may be particularly useful in Budd-Chiari syndrome; the exact mortality and morbidity are not yet clear. Long-term trials comparing all these methods are urgently needed.

7167 CUTANEOUS GRANULOMATA WITH PRIMARY BILIARY CIRRHOSIS. (Eng.) Byrne, J. P. H.; Cochrane, A. M. G.; Williams, D. I.; Williams, R. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London SE5 9RS, England). *Proc. R. Soc. Med.* 70(12):897-898; 1977.

The case of a patient with primary biliary cirrhosis who presented with cutaneous granulomata is reported. The patient, a 74-yr-old woman, had a 2-yr history of generalized pruritus that was associated for the last year with a widespread sheeted papular eruption in the trunk and limbs. On examination, there was slight generalized hyperpigmentation and a sheeted glistening flesh-colored papular eruption affecting the upper chest, back, and arms. A skin biopsy revealed granulomata in the dermis consisting of monuclear cells, epithelioid cells, and Langhan's type giant cells. A liver biopsy showed changes consistent with primary biliary cirrhosis. The patient was treated with cholestyramine, methyl cellulose eye drops, and monthly injections of vitamins A, D, and K. The authors hypothesize that circulating complexes involving IgM, which is elevated in primary biliary cirrhosis, lodge in the skin causing a vasculitis with subsequent granulomatous formation.

7168 HYPERGLUCAGONEMIA IN CIRRHOSIS: ALTERED SECRETION AND SENSITIVITY TO GLUCAGON. (Eng.) Sherwin, R. S.; Fisher, M.; Bessoff, J.; Snyder, N.; Hendler, R.; Conn, H. O.; Felig, P. (Yale Univ. Sch. Medicine, New Haven, CT 06510). *Gastroenterology* 74(6):1224-1228; 1978.

To study the mechanism of hyperglucagonemia in liver cirrhosis, the turnover of plasma glucagon was examined in cirrhosis. In addition, the effect of cirrhosis on tissue responsiveness to physiological increments in plasma glucagon was studied. The plasma glucagon concentration was elevated two- to sixfold in 13 cirrhotic patients with spontaneous portal systemic shunting or surgically induced portacaval anastomosis, but it was comparable to that in the 15 controls in the 4 cirrhotics without portasystemic shunting. The metabolic clearance rate of glucagon was normal in all of the cirrhotic groups, but the estimated basal systemic delivery rate of glucagon was increased two- to sixfold in the hyperglucagonemic patients. The blood glucose response to infusion of glucagon (3 ng/kg/min) was reduced in the cirrhotics with portasystemic shunting or portacaval anastomosis ($p<0.05$), and correlated inversely with the delivery rate of endogenous glucagon ($r=0.63$, $p<0.01$). The administra- tion of ammonium chloride (3 g) failed to elevate plasma glucagon concentration. It is concluded that hyperglucagonemia in cirrhosis is a consequence of hypersecretion rather than decreased hormonal catabolism. A negative feedback signal may exist between hepatic sensitivity to glucagon and the secretion of this hormone.

7169 MYELOPATHY IN CIRRHOSIS. (Eng.) Robinson, C. E.; Anzarut, A. (G. F. Strong Rehabilitation Center, Canada). *Paraplegia* 16(1):3-4; 1978.

The case of a patient with spinal cord disease associated with portacaval shunt for portal hypertension and cirrhosis is presented. Several months after the shunt was performed, the patient began to complain of weakness in the extremities, especially in the legs. When he was hospitalized 1 yr later, he had difficulty walking due to a spastic gait. He also had clinical jaundice, hepatomegaly, and some pedal edema. He had continued to drink excessively following surgery. He was found to have spastic tetraparesis but no sensory impairment. Bilateral adductor tenotomies were done to improve the patient's gait. Despite lower extremity weakness and spasticity, he was able to walk in parallel bars or with a walker, wearing below-knee braces. However, his rehabilitation program was interrupted on several occasions by dietary protein excess and hepatic precoma. The authors feel that he will not be a functional walker and will depend on a wheelchair for locomotion.

7170 EVIDENCE THAT ANGIOTENSIN-II PLAYS AN IMPORTANT ROLE IN THE HOMEOSTASIS OF ARTERIAL PRESSURE IN CIRRHOSIS WITH ASCITES [Abstract]. (Eng.) Arroyo, V.; Bosch, J.; Navarro, F.; Betriu, A.; Mauri, M.; Rodes, J. (Hospital Clinico y Provincial, Barcelona, Spain). *Digestion* 16(4):350-351; 1977.

7171 DEMECLOCYCLINE (DMC) TREATMENT OF FLUID RETENTION IN HEPATIC CIRRHOSIS (HC) [Abstract]. (Eng.) Riestra, J.; Skowsky, R.; Dougherty, M.; Larson, A.; Swan, L.; Smith, P. (Veterans Admin. Hosp., Long Beach, CA). *Clin. Res* 26(2):112A; 1978.

7172 RADIONUCLIDE SCAN PATTERNS IN BACTERIAL PERITONITIS ASSOCIATED WITH LIVER DISEASE [Abstract]. (Eng.) Punjabi, E.; Hain, D. R.; Brody, D. H.; Leevy, C. M. (Coll. Medicine, Dentistry of New Jersey, Newark, NJ). *Gastroenterology* 73(5):1240; 1977.

See also, 6818, 6923, 6932, 6978, 7067, 7144, 7150
7152, 7154, 7209.

Gallbladder and Biliary Tract Diseases

173 POSTOPERATIVE BIOPSY OF THE COMMON BILE DUCT VIA THE T-TUBE TRACT. (Eng.) Pala-ew, M. J.; Stein, L. (McGill Univ. and Jewish Gen-ral Hosp., 3755 Cote St. Catherine Rd., Montreal, uebec H3T 1E2, Canada). *Am. J. Roentgenol.* 130(2): 37-289; 1978.

o cases of postoperative common bile duct forceps iopsy via a postoperative T-tube tract are present-d. Both patients underwent this procedure because f fixed postoperative filling defects in the common ile duct. Using this technique, a neoplastic pro-ess could be excluded in both cases. Although the rocedure was well tolerated without incident or mplication in both patients, bleeding, perfora-ion, and pancreatitis could occur if caution is not ployed.

74 ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN A SURGICAL UNIT. (Eng.) Stan-rtskjold-Nordenstam, C. G.; Fraki, O. I. (Univ. ntral Hosp., SF-00290 Helsinki 29, Finland). *n. Clin. Res.* 10(1):30-37; 1978.

e value of endoscopic retrograde cholangiopancre-ography (ERCP) in the diagnosis of biliary and ncreatic diseases was assessed by reviewing the sults of 200 procedures performed on 195 patients a surgical unit. ERCP was diagnostic in 80% of e cases. The indications for the procedure were undice (27%), postcholecystectomy pain (22%), recur-nt acute pancreatitis (19%), complicated attack acute pancreatitis (14%), and other (18%). The sults of endoscopic retrograde cholangiography re normal in 26% of patients with persistent undice, and operation was thus avoided. In pa-ents with postcholecystectomy pain, pathological ndings were found in 50%, and half of them were erated upon. In pancreatitis, demonstration of e pancreatic ducts and grading of the disease cilitated selection of the treatment and enabled eoperative planning of the surgical procedure. e pancreas was resected in 13 of 59 cases with agnostic endoscopic retrograde pancreatography. pancreatic carcinoma, ERCP led directly to agnosis, but only 2 (ampullary carcinomas) of 10 re operable. The overall complication rate was , including one case of fatal hemorrhagic pan-eatitis.

75 EFFECT OF CALCITONIN ON THE SERUM AMYLASE LEVELS AFTER ENDOSCOPIC RETROGRADE CHO-NGIOPANCREATOGRAPHY. (Eng.) Odes, H. S.; Novis, N.; Barbezat, G. O.; Bank, S. (Groote Schuur sp., Observatory, 7925 Cape Town, South Africa). *gestion* 16(1/2):180-184; 1977.

ouble-blind study of the effect of calcitonin carried out in 30 patients undergoing endoscopic rograde cholangiopancreatography (ERCP), to de-mine whether calcitonin might protect against pancreatitis and hyperamylasemia, which sometimes complicate this procedure. Seventeen patients received an i.v. calcitonin infusion (2.5 μg/hr diluted in 50 ml 0.154 M NaCl) and 13 received a control NaCl infusion 4 hr before ERCP. There was no significant difference in the mean serum amylase concentration in patients receiving calcitonin or placebo during any of five observation periods. Five patients on calcitonin had abnormally high serum amylase levels, and two of the five developed abdominal pain typical of acute pancreatitis. Among those who received placebo, two had high serum amylase levels and abdominal pain. There was no significant difference in the urinary amylase output after ERCP in patients receiving calcitonin or placebo. The results suggest that calcitonin does not reduce the incidence of hyperamylasemia or pancreatitis after ERCP.

7176 RISK OF CANNULATION OF THE PAPILLA OF VATER. (Eng.) Myren, J. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):22-24; 1977.

A review of complications following endoscopic retrograde cholangiopancreaticography (ERCP) is presented using several large series recently reported. In a series of 8,691 cases in the United States, the success rate was 70%, frequency of complications about 3%, and death as a consequence of complications 0.2%. Pancreatitis after injection was found in 1% of cases; there were no deaths in this series. Pancreatic sepsis was observed in 25 cases, most probably caused by injection of the contrast medium into pseudocysts or behind stenoses; 5 of these patients died. Cholangitis was observed in 0.8% of cases and 8 of these 72 patients died, with 90% of them having obstructed bile ducts; prompt surgical intervention in such cases is important. Instrumental injury occurred in 16 patients, duodenal perforation in 3 with 1 death, and bleeding from esophageal varices in 1 patient with 1 death. Abnormal anatomy of the stomach and duodenum is a common cause of these complications, which may be prevented by prior x-ray examination. Among 12,421 patients in Europe and Japan, endoscopic retrograde cholangiography (ERC) was performed in 8,060 cases and endoscopic retrograde pancreaticography (ERP) in 10,004 cases. Cholangitis occurred in 0.38% and 0.65% of the ERC and ERP procedures, resp., and pancreatitis occurred only after ERP (0.65%, 9 of the 65 patients died). ERCP is a valuable method in which benefit far exceeds the risk.

7177 BILE DUCT ADENOMAS AS LIVER NODULES. (Eng.) Cho, C.; Rullis, I.; Rogers, L. S. (Veterans Admin. Hosp., Syracuse, NY 13210). *Arch. Surg.* 113(3):272-274; 1978.

To improve the differential diagnosis of bile duct adenoma or benign cholangioma from metastatic tumor, two case reports and 2,125 consecutive autopsy cases from a 10-yr period were reviewed. A 59-yr-old man with ulcerative colitis was suspected of having a malignancy on x-ray examination of the sigmoid colon. A frozen section biopsy was thought to reveal a metastatic well-differentiated adenocarcinoma, but re-examination of the permanent stained section established the diagnosis of bile duct adenoma. A 48-yr-old man injured in a car accident was found to have a single, whitish, 0.5-cm, firm nodule in the right lobe of the liver; it was diagnosed by frozen section as bile duct adenoma. Among the biopsy cases, 0.6% were found to have had bile duct adenomas; each case was an incidental finding, the clinical records showed no symptoms or signs related to the lesions, and the cause of death was not related to the adenomas in any case. A single nodule was found in nine cases, two nodules in three cases, and multiple lesions in one case; all were <1.0 cm in diameter; they were grayish-white to slightly yellow, subcapsular nodules and fell histologically into three groups. Group 1, bile duct adenoma with active bile duct proliferation and considerable lymphocytic infiltrate, included lesions relatively well-demarcated from surrounding liver tissue that showed irregularly branching and proliferating bile ducts with cuboidal, pale acidophilic to basophilic epithelial linings; the stroma was invariably infiltrated by lymphocytes and there were occasional lymphoid aggregates either in the nodule or at the periphery. The uniformity of cells and lack of atypia generally warrant diagnosis as a benign lesion, but, as in the first case, it can be mistaken for metastatic malignancy. Group 2, bile duct adenoma with abundant hyalinized stroma and sparse, inactive bile ducts, were generally well-demarcated, nonencapsulated, wedge-shaped lesions with a wide base on the capsular surface. Stroma was abundant with collagenation widely separating tubular lumens lined by flattened epithelium. Normal portal triads were generally difficult to identify and there were occasional lymphocytic infiltrates. Group 3, multiple bile duct adenomatosis, included lesions similar morphologically to those in group 2. There were numerous lesions in the parenchyma and a few subcapsularly, some interconnecting each other. Occasionally the bile ducts were greatly dilated to form cystic spaces, which could contain acidophilic proteinaceous material or bile.

7178 STUDIES ON THE PATHOGENESIS OF BILIARY ATRESIA.

(Eng.) Witzleben, C. L.; Buck, B. E.; Schnaufer, L.; Brzosko, W. J. (Children's Hosp. Philadelphia, 34th St. and Civic Center Blvd., Philadelphia, PA 19104). *Lab. Invest.* 38(5):525-532; 1978.

Liver biopsy and the extrahepatic biliary system from five infants (age 6 weeks-2.5 months) who underwent portoenterostomy for biliary atresia were studied by light microscopy to delineate the character and distribution of the anatomic lesions and by culture and immunofluorescence techniques for evidence of two viruses (cytomegalovirus and hepatitis B) that have been suspected in the genesis of biliary atresia. The case reports of the patients are presented. Control preparations were obtained from age-matched controls. The liver biopsies showed typical findings, with variable giant cell transformation, cholestasis, and prominent bile duct proliferation. In the extrahepatic biliary system, in all five cases there was lumen obliteration in the common hepatic duct, and in three cases there was also comparable obliteration in the common bile duct. No lumen dilation was evident proximal to the areas of obliteration. In the areas of obliteration, there was evidence of a resolving inflammatory process. Where the lumen was present, it tended to be small, especially in the hepatic and common ducts. In the porta hepatis, there appeared to be various stages of an evolving lesion, the earliest stage of which included extensive active epithelial injury with developing fibrosis, and the latest, more advanced fibrosis with reduction in duct lumen area. In the earlier stage, a dense inflammatory infiltrate, with small numbers of polymorphonuclear leukocytes, numerous lymphocytes, plasma cells, and eosinophils, was present. In the latter stage, mononuclear cells predominated, polymorphonuclear leukocytes were scant, but eosinophils were often still quite prominent. These findings demonstrate the presence of active ductal epithelial injury, at least in the porta hepatis, in this age group. There was no evidence of cytomegalovirus in any case or of hepatitis B in three of five cases. In two cases, one of the less specific techniques showed suggestive evidence of hepatitis B in the liver. These latter findings suggest that other viruses need to be sought or that cases should be studied at an earlier stage for the presence of these viruses.

7179 EXTRAHEPATIC BILIARY ATRESIA: RECENT DEVELOPMENTS IN MANAGEMENT.

(Eng.) Howard, E. R.; Mowat, A. P. (King's Coll. Hosp. Medical Sch., London SE5 8RX, England). *Arch. Dis. Child.* 52(11):825-827; 1977.

Developments in the management of extrahepatic biliary atresia in infants are briefly reviewed. Extrahepatic biliary atresia is commonly divided into surgically correctable and noncorrectable types. The former, accounting for approximately 15% of all cases, implies that there is a segment of extrahepatic bile duct, patent up to the porta hepatis, available for direct biliary-intestinal anastomosis no such segment is present in the noncorrectable cases. Although a satisfactory anastomosis may be created between bile duct and bowel in the "correctable" cases, only a minority of patients drain bile satisfactorily and survive for an extended period. Attempts to treat the "noncorrectable" types by partial hepatic resection, insertion of drainage tubes in the hepatic parenchyma, thoracic duct drainage to the esophagus, and hepatic lymph drainage to the jejunum have all failed. One author has shown that removal of the extrahepatic bile ducts and anastomosis of a loop of bowel to the area of the porta hepatis could result in bile drainage and long-term survival. Efforts to replicate this author's work were not universally successful, but the most recent reports from his unit suggest that if the operation is carried out

60 days of age, 80% will develop bile drainage, lling to 20% if delayed beyond this point. Three mplications commonly occur after portoenteros- my: recurrent cholangitis, increased intrahepatic brosis, and portal hypertension. The introduction portoenterostomy has clearly increased the ances of long-term survival in infants with ex- nsive destruction of the extrahepatic bile ducts, t such survival is still only achieved in a min- ity of patients. It appears that previous advice postpone surgery in cases of suspected biliary resia is not in the best interest of the patient.

30 EXPERIMENTAL INVESTIGATIONS INTO THE ETIOLOGY OF CHOLANGITIS FOLLOWING OPERA- N FOR BILIARY ATRESIA.

(Eng.) Hirsig, J.; a, O.; Rickham, P. P. (Dept. Pediatric Surgery, v. Zurich, Zurich, Switzerland). *J. Pediatr. g.* 13(1):55-57; 1978.

eriments were carried out on 8-week-old Gottingen ipigs to investigate the causation of cholang- s seen after hepato-porto-entero anastomosis. group 1 (7 animals), the bile duct was ligated the gallbladder was excised. In group 2 (5 mals), the lymphatic drainage of the liver was troyed by resecting and ligating all lymphatic sels in the region of the porta hepatis and by ision of the periportal lymph glands. In group 3 animals), the bile duct was tied and the lympha- drainage was resected. In group 4 (7 animals), bile duct was ligated, and bilateral truncal otomy was performed. In group 5 (22 animals), the rations performed in group 3 were repeated, and ateral truncal vagotomy was added. The incidence cholangitis was 0/7, 0/7, and 0/5 in groups 1, 2, 4, resp.; the incidence of cholangitis with atic abscesses was 5/7 and 13/22 in groups 3 5, resp. It appears that, in the minipig, the ces of postoperative cholangitis are much in- ised if the lymphatic drainage from the liver t least partially destroyed. *Streptococcus dans, S. hemolyticus*, and *Staphylococcus aureus* often found, and *Escherichia coli* and *Kleb- la* were occasionally discovered. These in- ions were found only in the liver and were ably hematogenous in origin, brought about by rfering with the resistance of the hepatic culoendothelial system by destroying the lym- ic drainage. Recent clinical experience is cited to support the conclusion that when a tic portoenterostomy is carried out for biliary sia, trauma to the lymphatics in the porta tis should be avoided, and an additional omento- to-portopexy should be done.

RECURRENT PYOGENIC CHOLANGITIS: A STUDY BY ENDOSCOPIC RETROGRADE CHOLANGIOGRAPHY.

.) Lam, S. K.; Wong, K. P.; Chan, P. K. W.; , H.; Ong, G. B. (Queen Mary Hosp., Hong Kong). *roenterology* 74(6):1196-1203; 1978.

applicability and clinical value of endoscopic ograde cholangiograms were studied in 52 patients recurrent pyogenic cholangitis. The earlier changes of recurrent pyogenic cholangitis were identified and found to be confined to the intrahepatic biliary tree. The left hepatic duct was more severely affected than the right hepatic duct and had a higher infestation by clonorchis. The severity of radiological changes correlated well with the duration of illness and the need for surgery. Gallstones were present in 34.2% of the patients and pancreatic ductal abnormality in 7.7%. The decision for surgery could be made early and accurately, and the type of surgery and the assignment of surgeons could be planned in advance. Cholangitis complicated endoscopic retrograde cholangiograms in 23.1% of the initial 26 patients without antibiotic cover but in none of the subsequent 26 in whom this was used. This study shows that endoscopic retrograde cholangiography confers significant advantages to the management of recurrent pyogenic cholangitis.

7182 A FATHER AND SON WITH CHOLESTASIS AND PERIPHERAL PULMONIC STENOSIS.

(Eng.) Riley, C. A.; LaBrecque, D. R.; Ghent, C.; Horwich, A.; Klatskin, G. (Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT 06510). *J. Pediatr.* 92(3): 406-411; 1978.

The case reports of a 27-yr-old man and his infant son are presented to establish diagnostic criteria for the syndrome of cholestasis and peripheral pulmonic stenosis (PPS) that permit its differentiation from Byler disease, a progressive form of intrahepatic cholestasis. Both the father and son presented with neonatal jaundice and cardiovascular abnormalities, have frontal bossing, vertebral anomalies, hypercholesterolemia, and mild malabsorption of fat. Early liver biopsy reveals the absence of the bile ducts; late liver biopsy shows no cirrhosis or fibrosis. Survival is prolonged. The syndrome appears to be inherited as an autosomal dominant trait. In Byler disease, the presenting symptom is malabsorption; jaundice occurs in attacks and then persists; cholesterol level is normal or low; there is rickets and no cardiovascular malformation; early liver biopsy shows fibrosis or decreased ducts; late biopsy shows cirrhosis; death occurs in childhood; and the trait behaves as an autosomal recessive. The most likely underlying pathogenesis of cholestasis with PPS is an inborn error of metabolism. It is postulated that there may be a defect in bile formation, perhaps a defect in bile acid or cholesterol excretion, resulting in a diminution of total bile flow that causes a rapidly progressive atrophy of a majority of the intrahepatic bile ducts shortly after birth. Choledochoduodenostomy has been used as therapy, but with unclear benefit. Cholestyramine and phenobarbital were not of benefit to the father. There are other aspects of these cases that remain unclear and warrant additional investigation.

7183 I^{131}-ROSE BENGAL SCANNING IN THE DETECTION OF CHOLECYSTOCOLIC FISTULA: NEW USE OF AN ESTABLISHED PROCEDURE.

(Eng.) Zaw-Win, B.; Darwish, M.; Dibos, P. E.; Razzak, I. A. (Franklin Square Hosp., Towson, MD). *Am. J. Gastroenterol.* 68(4):396-398; 1978.

The case of a 60-yr-old man who was admitted to hospital with a 3-month weight loss of 12.5 kg and vague right upper quadrant pain is presented. Previous examination had revealed chronic gastritis and abnormal liver function tests. Upper gastrointestinal series, barium enema, abdominal sonography, and celiac angiogram failed to reveal an abnormality. The gallbladder was not visualized on a p.o. cholangiogram or an i.v. cholangiogram, but air was seen in the biliary tree. A ^{131}I-rose bengal liver study revealed normal distribution of the tracer in the liver 30 min after injection, normal activity in the liver, gallbladder, transverse colon, and splenic flexure at 2 hr, and decreasing activity in the liver with increasing activity in the transverse colon and splenic flexure after 4 hr. These findings suggested a cholecystocolic fistula, which was confirmed at laparotomy. Cholecystectomy and repair of the cholecystocolic fistula were performed. Pathological examination revealed chronic cholecystitis and cholelithiasis. It is recommended that ^{131}I-rose bengal studies be used in patients suspected of having fistulas between the gallbladder and other organs. The procedure is relatively simple, safe, and noninvasive; its diagnostic sensitivity remains to be established.

7184 HEPATIC FUNCTION IN CHOLELITHIASIS. (Pol.)

Markert, R. (Instytut Chirurgii AM, ul. Zelwerowicza 26a, 90-147 Lodz, Poland). *Pol. Przegl. Chir.* 49(12):1265-1270; 1977.

Liver function tests were performed in 50 patients with uncomplicated cholelithiasis before, immediately and 6-12 months after surgery. Liver tissue samples collected during surgery were also examined histologically; they showed chronic hepatitis in 30% of the patients. The BSP retention was increased in all patients before, immediately after, and 6-12 months after surgery; increases of >20% were found in 36% of the patients before surgery, in 18% immediately after surgery, and in 12% 6-12 months after surgery. The aspartate-aminotransferase activity was increased in 28% of the patients before surgery, in 20% after surgery, and in 2% 6-12 months after surgery. The alanine-aminotransferase activity was increased in 43% of the patients before surgery, in 38% after surgery, and in 9% 6-12 months after surgery. Symptoms of impaired hepatic function persisted in 10% of the patients. The findings indicate that surgery does not always lead to full recovery.

7185 PRESENT FEATURES OF GALLSTONES IN JAPAN: A COLLECTIVE REVIEW OF 2,144 CASES. (Eng.)

Nagase, M.; Tanimura, H.; Setoyama, M.; Hikasa, Y. (Kyoto Univ. Sch. Medicine, Shogoin, Sakyoku, Kyoto, Japan 606). *Am. J. Surg.* 135(6):788-790; 1978.

The types and sites of gallstones were studied in 2,144 patients operated on for cholelithiasis at 37 hospitals during the last 22 months. Cholesterol stones were seen in 70.4% of patients, and 86.3% of the cholesterol stones occurred in the gallbladder alone. Bilirubin stones were seen in 23.5% of cases and were almost equally distributed in the gallbladder and the common bile duct. Most patients younger than 39 yr had cholesterol gallstones, and these were located mainly in the gallbladder. In contrast, patients older than 60 yr mostly had bilirubin stones, and these were located in both the common bile duct and the gallbladder. Almost twice as many women as men had cholesterol stones, but no sex difference was noted with bilirubin stones. The authors conclude that recent westernization of dietary habits in Japan is the most probable factor causing the increased incidence of cholesterol gallstones. The decreased incidence of bilirubin stone may be caused by the decreased incidence of biliary infection and increased intake of dietary protein.

7186 COMPARISON BETWEEN THE USE OF ORAL CONTRACEPTIVES AND THE INCIDENCE OF SURGICALLY CONFIRMED GALLSTONE DISEASE. (Eng.)

Leissner, K. H.; Wedel, H.; Schersten, T. (Sahlgrenska sjukhuset, S-413 45, Goteborg, Sweden). *Scand. J. Gastroenterol.* 12(7):893-896; 1977.

To determine whether there is a relationship between the use of oral contraceptives and the development of gallstone disease, the incidences of gallstone surgery in women and men in two Swedish cities in 1961 (before the introduction of oral contraceptives) were investigated and compared with the corresponding incidences in 1971 (2 yr after the peak sale of oral contraceptives and 6 yr after their introduction). The number of cholecystectomies in men in both cities increased from 222 pe 1,000 inhabitants in 1961 to 406/1,000 in 1971 and women from 384/1,000 to 597/1,000. In one city (Falun), there was an increased incidence of cholecystectomies in women aged 25-29 yr and those aged 55-65 yr between 1961 and 1971. The change in the incidence of cholecystectomy in men and women in Gothenburg was statistically analyzed, using the ratio $(f^a_{71}/f^a_{61})/(m^a_{71}/m^a_{61})$, in which f^a_{61} and f^a_{71} denote the incidence for women in any 5-yr age gro for 1961 and 1971 and m^a_{61} and m^a_{71} denote the corresponding incidences for men. The ratio was above unity in the ages between 25 and 54 yr and reached statistical significance in the age groups 25-29, 35-39, and 40-44 yr (p=0.029, p=0.024, and p=0.045, resp.). These findings suggest a causal relationship between the use of oral contraceptive and the development of gallstones.

7187 A PROSPECTIVE STUDY OF THE CLINICAL VALU AND ACCURACY OF GREY SCALE ULTRASOUND I DETECTING GALLSTONES. (Eng.)

McKay, A. J.; Dunca J. G.; Imrie, C. W.; Joffe, S. N.; Blumgart, L. H. (Royal Infirmary, Glasgow, Scotland). *Br. J. Surg* 65(5):330-333; 1978.

The accuracy and possible clinical value of grey scale ultrasonography in the detection of gallstones were studied prospectively in 100 unselecte patients presenting with recurrent biliary colic, acute cholecystitis, or acute pancreatitis. Adequate visualization of the gallbladder was obtain

in 79 cases, with 3 false-positive and no false-
egative results. In patients in whom scanning
as technically satisfactory and adequate visuali-
ation was obtained, the presence or absence of
allstones was correctly diagnosed in 96%. The
allbladder was adequately visualized in 80% of
0 patients with recurrent biliary colic, in 87%
f 30 patients with acute cholecystitis, and 73%
f 40 patients with acute pancreatitis. One of
he false-positive results occurred in the biliary
olic group. This patient showed several discrete
roups of echoes on the posterior wall without
hadowing. The other two false-positive cases
ere recorded in the acute pancreatitis group;
either demonstrated shadowing, but both showed
n irregular area of increased echoes along a seg-
ent of the posterior wall of the gallbladder. The
ajor cause of failure was the presence of intes-
inal gas obscuring the ultrasound image, and the
allbladder was not visualized in 21% of the cases.
rey scale ultrasonography is of value in patients
n whom oral cholecystography fails or is contra-
ndicated and in patients with compromised liver
nction.

188 COMPARISON OF FIXED DOSES OF CHENODEOXYCHOLIC ACID FOR GALLSTONE DISSOLUTION.

Eng.) Bateson, M. C.; Murison, J.; Ross, P. E.;
ouchier, I. A. D. (Ninewells Hosp. and Medical
ch., Dundee DD1 9SY, Scotland). *Lancet* 1(8074):
11-1114; 1978.

nety-six patients with gallstones who were treated
r up to 4 yr with chenodeoxycholic acid in daily
ses of 500, 750, or 1,000 mg were studied to de-
rmine whether fixed-dose therapy can be used suc-
ssfully in clinical practice and to establish
ether there are any differences in response to
fferent doses. None of the patients started on
0 mg daily showed complete gallstone dissolution.
ght of 41 patients on 750 mg daily had complete
ssolution of their radiolucent gallbladder stones
ter 6 or more months, and a further 4 showed
rtial dissolution. Five of 28 patients on 1,000
daily had complete dissolution of their radio-
cent stones after at least 6 months, and a further
showed partial gallstone dissolution. The mean
ration of therapy was greater on 750 mg than on
000 mg/day (1.27 versus 0.58 yr), and when results
re analyzed after the first 6 months of therapy,
e total response-rate was significantly ($p<0.05$)
eater for the 1,000 mg dose (13/28) than for the
0 mg dose (9/41). The individual response of
diolucent gallbladder stones to therapy could not
predicted from stone size, weight of patient,
sage per kg, or change in biliary lipids. Treat-
nt of radiolucent gallstones with chenodeoxycholic
id should start at 1,000 mg daily.

89 SUCCESSFUL REMOVAL OF RETAINED BILE DUCT STONES BY ENDOSCOPIC SPHINCTEROTOMY.

g.) Byrnes, D. J.; Hennessy, W. B.; Meredith,
G.; Piper, R. B. (St. Vincent's Hosp., Sydney,
South Wales 2010, Australia). *Med. J. Aust.*
4):803-804: 1977.

Two cases in which endoscopic sphincterotomy was successful in allowing the passage of stones retained in the common bile duct after cholecystectomy are presented. In the first patient, a 55-yr-old woman who had experienced four episodes of jaundice during a 14-yr period following cholecystectomy, an i.v. cholangiogram failed to outline the common bile duct. Endoscopic retrograde cholangiography showed the common duct to be grossly dilated and to contain five calculi, each approximately 1 cm in diameter. A 1.5-cm sphincterotomy was performed; this procedure was followed by a gush of bile and dye into the duodenum. During the following week, the patient experienced an episode of epigastric pain, and a second endoscopic cholangiogram confirmed that all calculi had been passed. In the second patient, a 29-yr-old woman, a post-cholecystectomy T-tube cholangiogram revealed two calculi in the common bile duct. Endoscopic sphincterotomy was performed 3 weeks after the operation. The T-tube was then flushed with sterile saline under antibiotic cover. The infusion was suspended after the patient had a rigor 12 hr later. A second T-tube cholangiogram showed that one stone remained. The sphincterotomy was extended, and this was followed by passage of the second stone. In this case, the authors feel that the surgeon's being able to perfuse the bile duct through the T-tube may have been a factor in ensuring passage of the stones.

7190 OPERATIVE CHOLANGIOGRAPHY IN TWO HUNDRED CONSECUTIVE CHOLECYSTECTOMIES. (Eng.)

Sugrue, W. J.; Stewart, R. J.; Pascoe, D. L.; Macbeth, W. A. A. G. (Christchurch Clinical Sch. Medicine, Christchurch, New Zealand). *N.Z. Med. J.* 86(600):470-471; 1977.

The value of operative cholangiography and the reasons for its failure were assessed by reviewing the records of 200 consecutive patients undergoing cholecystectomy for gallstones. Of these, 164 had an operative cholangiogram; the remaining 36 had no examination because of satisfactory preoperative x-rays of the bile ducts, inability to cannulate the cystic duct, x-ray machine failure, anticipated hazard to the patient, emergency cholecystectomy, no arrangements made, and easily palpable common bile duct stones. There were 37 patients who had one or more traditional criteria for common bile duct exploration but had a normal cholangiogram; these patients were thus spared unnecessary choledochotomy. Unsuspected common duct stones were detected by cholangiography in three patients. In 31 examinations that were considered to be failures, the major faults were exposure or film fault in 9, incorrect tube positioning in 9, nonvisualization of hepatic ducts in 6, obscuring of the bile ducts by the spine in 4, and catheter tip in duodenum in 3. It appears that the major advantage of operative cholangiography lies in the avoidance of unnecessary common bile duct exploration.

7191 THE REASONS FOR FAILURE OF ENDOSCOPIC RETROGRADE CHOLANGIO-PANCREATOGRAPHY IN

PATIENTS WITH JAUNDICE. (Eng.) Hoare, A. M.; West, R. J.; Cockel, R. (Queen Elizabeth Hosp., Birmingham 15, England). *Clin. Radiol.* 29(2):201-203; 1978.

The results of 100 consecutive attempts by experienced endoscopists at endoscopic retrograde cholangiopancreatography (ERCP) in jaundiced patients were analyzed to determine the cause for failure. The indications for endoscopy were cholestasis in 74 patients and liver function tests suggestive of incomplete biliary obstruction in 26 (12 of whom had previously undergone cholecystectomy). ERCP provided a diagnosis in 75/100 of the cases. The reason for failure to cannulate the correct duct was obstruction at the lower end of the common bile duct in 15 patients, distortion of the duodenum in 7, and broken instrument in 1; there was no cause for failure in the remaining 2 cases (both had intrahepatic cholestasis and tolerated the procedure poorly). Failure due to obstruction was caused most frequently by carcinoma of the pancreas (8 cases) or by a stone in the common bile duct (5 cases). It is difficult to see how increased skill could have made cannulation succeed in most of these 25 patients. Transhepatic cholangiography may be a possible alternative method of diagnosis in such cases.

7192 ULTRASONIC EXAMINATION IN JAUNDICE. (Ger.) Rettenmaier, G.; Seitz, K. H. (Innere Abteilung des Kreiskrankenhauses, Bunsenstr. 120, 7030 Boblingen, W. Germany). *Dtsch. Med. Wochenschr.* 102(43):1559-1560; 1977.

Experience with the sonographic diagnosis of jaundice is reported. Sonography makes it possible to visualize the gallbladder (dilated or not), gallbladder stones, dilated intrahepatic and extrahepatic bile ducts, stones in the dilated common bile duct, and tumors of the bile duct and porta hepatis. Sonographic investigations were performed in 60 patients with distal biliary obstruction. The cause of the obstruction was recognized in 37 cases (carcinoma of the head of the pancreas was diagnosed in 21 cases, metastases to the porta hepatis in 5, choledocholithiasis in 6, carcinoma of the common bile duct in 3, pancreatitis in 2). The cause of the obstruction was not recognized in 23 cases; it was determined by subsequent investigations to be carcinoma of the head of the pancreas and papilla in 8 cases, metastasis to the porta hepatis in 1, choledocholithiasis in 10, carcinoma of the common bile duct in 1, carcinoma of the gallbladder with metastases in 1, and papillary stenosis in 2. The findings indicate the great value of sonography in the diagnosis of biliary obstruction.

7193 COINCIDENTAL OBSTRUCTIVE AND POST-HEPATITIC CHOLESTATIC JAUNDICE. (Eng.) Welsby, P. D.; Smith, C. C.; Ewen, S. W. B.; Brunt, P. W. (Dept. Medicine, Univ. Aberdeen, Scotland). *Postgrad. Med. J.* 53(626):751-752; 1977.

The case of a patient in whom obstructive jaundice due to carcinoma of the pancreas occurred during the cholestatic phase of viral hepatitis is presented. A previously healthy 37-yr-old man developed jaundice, dark urine, and pale stools. Two weeks after the appearance of jaundice, he developed generalized pruritus. An initial diagnosis of virus A hepatitis proceeding to chronic cholestasis was made on clinical and histological grounds and was corroborated by the development of a similar illness with identical histopathological findings in his brother. However, in spite of corticosteroid and cholestyramine therapy, the pruritus and jaundice persisted. The liver became progressively enlarged and irregular, and at this stage the gallbladder became palpable. The patient then developed liver failure, ascites, and renal failure. Abdominal paracentesis revealed serous fluid containing many adenocarcinoma cells. At autopsy, there was considerable distention of the gallbladder and common bile duct related to an extensive carcinoma of the head of the pancreas, which proved to be a primary ductal adenocarcinoma. The dangers inherent in the use of corticosteroids in jaundiced patients and in the interpretation of a non-response to such therapy in patients with severe cholestatic jaundice are illustrated by this case.

7194 PROLYL HYDROXYLASE IN THE SKIN OF PATIENTS WITH OBSTRUCTIVE JAUNDICE. (Eng.) Than, T.; McGee, J. O.; Blumgart, L. H. (Glasgow Royal Infirmary, Glasgow, Scotland). *J. Clin. Pathol.* 30(11):1044-1047; 1977.

Prolyl hydroxylase activity was estimated in skin specimens from 24 patients with obstructive jaundic and 25 nonjaundiced patients to investigate the suspicion that wound healing is defective in jaundiced patients. Prolyl hydroxylase activity in two of three batches of skin specimens from the jaundiced patients was approximately 50% of that of the controls, and only one-third of that of the controls in the third batch. There was no detectable difference in prolyl hydroxylase activity between patients jaundiced as the result of bile duct obstruction or as a result of liver disease, and there appeared to be no difference between patients with benign or malignant common bile duct obstruction. The results suggest that jaundice is associated with low skin prolyl hydroxylase levels, and in patients submitted to operation for obstructive jaundice this condition might impair healing. Because this enzyme catalyzes hydroxyproline synthesis in collagen, its reduced level could lead to a diminution in the stability of skin collagen, or the low level is simply an indicator of generali depressed collagen synthesis.

7195 COMMON BILE DUCT OBSTRUCTION ASSOCIATED WITH A DACRON H-GRAFT PORTACAVAL SHUNT. (Eng.) Prinz, R. A.; Pickleman, J. (Loyola Univ. Medical Center, 2160 S. First Ave., Maywood, IL 60153). *Arch. Surg.* 113(3):333-335; 1978.

An unusual case is described in which a Dacron pro thesis, used to perform an H-graft portacaval shu

eroded into the common bile duct, served as a nidus
for stone formation and resulted in ascending cholangitis. A 45-yr-old woman had recurrent bleeding
esophageal varices for which she had been treated
successively with a Dacron H-graft portacaval shunt,
subtotal gastrectomy and Billroth II reconstruction,
and balloon tamponade. When the portacaval shunt
failed to function, intra-arterial vasopressin was
followed by splenorenal shunt, splenectomy, and resection of the tail of the pancreas. Fifteen months
later, the patient presented with fever, chills,
upper right quadrant pain with nausea and vomiting,
and jaundice. A diagnosis of ascending cholangitis
was made; cholecystectomy and operative cholangio-
raphy were carried out. The common bile duct was
ilated and obstructed by thick, inspissated bile
nd friable stone formation. Multiple stones and
he full 2-cm Dacron graft were extracted from the
uct. The Dacron graft and bile yielded, upon cul-
ure, *Escherichia coli*, γ-*Streptococcus* group D,
nd *Proteus mirabilis*. Microscopically, the gall-
ladder revealed fibrous thickening with an acute
nd chronic inflammatory cell infiltrate and focal
reas of micro-abscess formation. Prevention of
his potential complication by aseptic technique
nd by isolating the graft from all other intra-
bdominal organs by the interposition of viable
issue is important.

196 DIFFUSE PAPILLOMATOSIS OF THE BILIARY TRACT.

(Eng.) Jakimowicz, J. J.; Stock-
ann, C. H. J. (Dept. Surgery, St. Franciscus Gast-
uis, Rotterdam, Netherlands). *Arch. Chir. Neerl.*
9(4):255-259; 1977.

he case of a 62-yr-old man with diffuse papil-
omatosis of the biliary tract is reported. The
atient presented with vague upper abdominal symp-
oms, dark urine, colorless feces, and icterus. His
evel of total bilirubin was 240 μM, alkaline phos-
hatase 216 mU/ml, thymol 2 U, SGOT 115 mU/ml,
GPT 93 U/ml; his urine contained bilirubin and
robilin. Liver biopsy suggested congestion in
he biliary tract with pericholangitis. The ic-
erus exacerbated after 1 week, and percutaneous
ranshepatic cholangiography showed a few slightly
ilated intrahepatic bile ducts with several small
illing defects and an obstruction near the hepatic
ilus. Laparotomy revealed numerous small polypous
ucosal tumors in the extrahepatic bile ducts with-
ut signs of intraparietal infiltration. The
rowths were removed as far as possible, a T-drain
as left in the choledochus, and cholecystectomy
as performed. Cytological examination of resected
issues revealed no malignancy. Pathological ex-
mination suggested a benign bile duct papilloma-
osis. The patient was discharged with nearly nor-
l liver functions. One year later, the patient
as readmitted comatose with icterus and with fever
to 40 C; his ESR was 130 mm, WBC 14.2, alkaline
osphatase level 220 mU/ml, and total bilirubin
evel 110 μM. The patient died several days later
om septic shock, probably as a consequence of the
currence of cholangitis and possibly with the
rmation of an intrahepatic abscess.

7197 SPONTANEOUS PERFORATION OF BILE DUCTS IN NEONATES.

(Eng.) Fitzgerald, R. J.; Parbhoo, K.; Guiney, E. J. (Royal Children's Hosp., Flemington Rd., Parkville, Victoria 3052, Australia). *Surgery* 83(3):303-305; 1978.

The cases of three neonates with spontaneous perforation of the bile ducts are reviewed, and the mode of presentation, treatment, and relevant literature are discussed. All three patients appeared to be well for the first 1 to 2 weeks after birth. Nonbile-stained vomiting and acholic stools were present in all three on admission. Marked abdominal distention was evident in two and became so in the third. The liver function tests were normal in all three children, excluding the raised bilirubin levels. Bile cultures were negative in the two infants in whom this was done. All patients were treated by laparotomy in the seventh week, with attempted closure of the perforation and a simple biliary diversion by cholecyst-jejunostomy with jejunojejunostomy below it. The patients have done well, and one is now 12 yr of age. Experience with these patients confirms the belief that, where there is doubt about the patency of the distal bile duct, a diversionary procedure should be performed.

7198 TWO INSTANCES OF BILE REFLUX WITHOUT ACUTE PANCREATITIS.

(Eng.) White, T. T.; Allan, B. J. (Univ. Washington Hosp., Seattle, WA). *Surg. Gynecol. Obstet.* 146(6):917-920; 1978.

The cases of two patients in whom most of the bile and the pancreatic juice were mixed but who did not develop acute pancreatitis are presented. Bile and pancreatic juice were mixed within the pancreatic duct and drained through the tail of the pancreas because of a presumed surgical injury to the ampulla of Vater in the first patient. In the other patient, bile and pancreatic juice were mixed within the bile duct secondary to a tumor of the ampulla of Vater. The amount of active trypsin in the bile-pancreatic juice mixtures from these patients more or less paralleled that of bile-staining. The levels of chymotrypsin did not follow the bile-staining as markedly. Three of four specimens from the first patient passed through the pancreas without activation. None of these samples was visibly bile stained. All of the other specimens showed varying amounts of active trypsin and chymotrypsin, and it was not possible to determine whether activation had occurred in the pancreatic ducts or whether it took place sometime later during collection or storage. These observations indicate that, while bile may have a role in the production of pancreatic disease, additional factors are required to produce acute pancreatitis. It is possible that trypsin inhibitors contained in human bile and pancreatic juice may bind trypsin.

7199 REPAIR OF BENIGN STRICTURE OF THE COMMON BILE DUCT BY JEJUNAL INTERPOSITION CHOLE-

DOCHODUODENOSTOMY. (Eng.) Wheeler, E. S.; Longmire, W. P., Jr. (Univ. California at Los Angeles Sch. Medicine, Los Angeles, CA). *Surg. Gynecol. Obstet.* 146(2):260-262; 1978.

Repair of benign common bile duct stricture by jejunal interposition choledochoduodenostomy is described and discussed. The interposition of an isolated segment of isoperistaltic jejunum from the obstructed common duct to the proximal duodenum was previously reported and used to treat both obstruction of the common duct in the region of the papilla and recurrent cholecystopancreatitis. The procedure has now been carried out with good results in a patient with benign stricture. An isolated jejunal segment (at least 15 cm in length) is placed in a retrocolic position. Jejunal continuity is re-established by an end-to-end anastomosis. The proximal end of the jejunal segment is closed in two layers, and an end-to-side choledochojejunal anastomosis is performed, with an inner row of interrupted catgut sutures and an outer row of interrupted silk sutures. The distal end of the jejunal segment is then anastomosed in two layers to the side of the proximal portion of the duodenum. A long-limbed T tube is placed in the duct with one limb passing through the anastomosis into the jejunal segment to decompress the biliary system in the initial postoperative period. This technique has special advantages, including that (1) the obstruction is relieved by reconstruction with a mucosal-lined structure, (2) bile is drained into the proximal duodenum, making peptic ulceration less likely, (3) the biliary-enteric anastomosis can be performed without tension, lessening the chance of anastomotic leak, and (4) the length of the jejunal segment in an isoperistaltic direction reduces the likelihood of reflux of duodenal contents into the bile duct.

7200 AN ADDED DIMENSION TO THE OPERATIVE CHOLANGIOGRAM. (Eng.) Byerly, W. G.; Fahl, J. C. (Medical Arts Clinic, Hickory, NC). *Abdom. Surg.* 19(11/12):237-241; 1977.

The records of 87 patients undergoing 88 cholecystectomies with or without operative cholangiograms and with or without common bile duct exploration (CBDE) are reviewed to assess the need for operative cholangiography. Operative cholangiograms were performed in 71 patients, and 10 were abnormal. Of these 10, 3 indicated the need for CBDE, which would have been done anyway because of clinical and laboratory findings; these 3 cases were positive at exploration. Another three cases of CBDE were indicated solely on the basis of the operative cholangiograms, and these cases were negative at exploration, giving a false-positive rate of 4% for operative cholangiography. Of 30 patients who had one or more commonly accepted classical indications for CBDE, 22 were not explored because of a normal cholangiogram. Operative cholangiography was useful in indicating the need for CBDE in two patients where it was otherwise unexpected; in one of these cases, the surgeon elected not to perform CBDE, while in the other case, cholangiography demonstrated multiple common bile duct stones. Operative cholangiography was also useful in demonstrating abnormal ductal pathology in two cases. A value or help rate can be established by taking the number of cases in which CBDE was avoided when otherwise indicated (22), adding the number of cases in which CBDE was indicated when otherwise unsuspected and subsequently proved to have been needed (1), and adding the CBDE procedures saved because abnormal anatomy was identified (2). Thus, 25 of 71 procedures were helpful, giving a value rate of 35%. Of 17 cholecystectomies that included a pathologic diagnosis of acute cholecystitis, 11 had normal operative cholangiograms, preventing unnecessary CBDE in 64.7% of such cases. Twelve postoperative complications occurred in nine patients. One patient died on the ninth postoperative day of massive hemorrhagic pancreatitis; this death was felt not to be related to the cholangiogram but rather to the underlying pathology and operative procedure. Operative cholangiography is concluded to be a cost-effective method of limiting unnecessary surgery.

7201 OPERATIVE PROCEDURES FOR CHOLEDOCHAL CYST. (Eng.) Kasai, M.; Suzuki, H.; Ohi, R. (Tohoku Univ. Sch. Medicine, Sendai, Japan). *Jpn. J. Surg.* 7(3):147-150; 1977.

7202 SEVERE JAUNDICE AFTER RUPTURE OF ABDOMINAL AORTIC ANEURYSM. (Eng.) Hermreck, A. S.; Proberts, K. S.; Thomas, J. H. (Univ. Kansas Medical Center, 39th and Rainbow Blvd., Kansas City, KN 66103). *Am. J. Surg.* 134(12):745-748; 1977.

7203 EVALUATION OF BACTERIA AND BILIARY TRACT DISEASES. (Eng.) Singh, Z.; Wani, N. A.; Misgar, M. S.; Rashid, P. A. (Government Medical Coll., Srinagar, Kashmir, India). *Int. Surg.* 62(10): 564-565; 1977.

7204 GALLSTONES. (Eng.) Bouchier, I. A. D. (Dept. Medicine, Univ. Dundee, Dundee DD1 9SY, Scotland). *Proc. R. Soc. Med.* 70(9):597-599; 1977.

7205 INITIAL EXPERIENCE WITH ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY: THE ROLE IN CLINICAL PRACTICE. (Eng.) Morley, K. D.; Campbell, C. B. (Christchurch Clinical Sch. Medicine, Christchurch, New Zealand). *N.Z. Med. J.* 86(594):169-173; 1977.

7206 GALLSTONE ILEUS AND CHOLECYSTODUODENAL FISTULA. (Eng.) Clifford, W. J.; Garcia, E. L. (Univ. Miami Sch. Medicine, Miami, FL). *Abdom Surg.* 19(11/12):242-243; 1977.

7207 CHENODEOXYCHOLIC ACID (CDC) INDUCED INHIBITION OF LYMPHOPROLIFERATIVE RESPONSE TO MITOGENS [Abstract]. (Eng.) Podda, M.; Gianni,

.; Di Padova, F. (Clinica Medica III, Universita
i Milano, Milan, Italy). *Digestion* 16(4):346;
977.

208 CONGENITAL DILATATION OF THE BILIARY TRACT;
NEW CLASSIFICATION AND STUDY WITH PARTICU-
AR REFERENCE TO ANOMALOUS ARRANGEMENT OF THE PANCREA-
ICOBILIARY DUCTS. (Eng.) Komi, N.; Udaka, H.;
keda, N.; Kashiwagi, Y. (Tokushima Univ. Sch.
edicine, 3-18-15 Kuramoto-cho, Tokushima-shi,
okushima 770, Japan). *Gastroenterol. Jpn.* 12(4):
93-304; 1977.

209 ULTRASTRUCTURAL STUDIES ON PATHOGENESIS
OF INTRAHEPATIC CHOLESTASIS [Abstract].
Eng.) Sasaki, H. (Third Dept. Internal Medicine,
iigata Univ., Niigata, Japan). *Gastroenterol. Jpn.*
2(4):334; 1977.

210 ENERGY METABOLISM OF THE LIVER IN BILE
STASIS [Abstract]. (Eng.) Sugahara, K.;
itani, S. (Faculty Medicine, Univ. Tokyo, Tokyo,
apan). *Gastroenterol. Jpn.* 12(4):334-335; 1977.

211 EFFECT OF FATTY ACID (FA), ALBUMIN, AND
BILE SALTS ON ELECTROPHORETIC MOBILITY
F LIPOPROTEIN-X (LP-X) [Abstract]. (Eng.) Simon,
. B.; Poon, R. W. M. (Dept. Medicine, Queen's
niv., Kingston, Ontario, Canada). *Clin. Res.*
(5):689A; 1977.

212 ULTRASTRUCTURE OF BOTRYOID SARCOMA OF
THE COMMON BILE DUCT. (Eng.) Taura, S.;
ura, M.; Tanaka, N.; Ito, T.; Tsuchiya, R. (Burn-
des Res. Lab., Univ. Illinois at Urbana-Champaign,
rbana, IL 61801). *Gastroenterol. Jpn.* 12(4):305-
0; 1977.

13 ENDOSCOPIC CHOLEDOCHODUODENOSTOMY FOR
CHOLEDOCHOLITHIASIS THROUGH CHOLEDOCHO-
ODENAL FISTULA. (Eng.) Osnes, M.; Kahrs, T.
lleval Hosp., Oslo 1, Norway). *Endoscopy* 9(3):
2-165; 1977.

14 ACUTE OBSTRUCTIVE SUPPURATIVE CHOLANGITIS
IN A MAN WITH AN ENLARGED INFERIOR PANCRE-
TICODUODENAL LYMPHNODE. (Eng.) Yamamoto, H.;

Koizumi, T.; Fujimura, T. (Osaka Koseinenkin Hosp., 4-Chome, Fukushima Osaka 553, Japan). *Gastroenterol. Jpn.* 12(4):317-320; 1977.

7215 PRIMARY CLOSURE OF THE COMMON BILE DUCT AFTER EXPLORATION FOR GALLSTONES. (Eng.) Nagase, M.; Tanimura, H.; Takenaka, M.; Setoyama, M.; Mukaihara, S.; Kamata, T.; *et al.* (Kyoto Univ., Sch. Medicine, Sakyo-ku, Kyoto 606, Japan). *Arch. Jpn. Chir.* 47(1):90-93; 1978.

7216 TECHNIQUE OF ENDOSCOPIC PAPILLOTOMY: BELGIAN CONTRIBUTION TO THE WORLD EXPERIENCE. (Eng.) Cremer, M.; Gulbis, A.; Toussaint, J.; De Toeuf, J.; Vanlaethem, A.; Hemanus, A. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 219-227; 1977.

7217 ENDOSCOPIC CONTROL OF SURGICAL SPHINCTEROPLASTY. (Eng.) Rey, J. F.; Tea, J. P.; Ljunggren, B.; Faure, X.; Delmont, J. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 213-218; 1977.

7218 OPERATIVE DILATATION OF THE SPHINCTER OF ODDI. (Eng.) Rohner, A.; Weibel, M. A.; Kalfopoulos, P.; Squifflet, J. P.; Moser, G.; Froideveaux, A. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 187-189; 1977.

7219 FUNCTIONAL DISORDERS OF ODDI'S SPHINCTER AND OF THE DUODENOBILIARY SYSTEM. (Eng.) Albot, G. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 123-128; 1977.

See also, 6776, 6782, 6798, 6807, 6932, 6942, 7025, 7032, 7041, 7072, 7075, 7087, 7107, 7132, 7220, 7247, 7248, 7250.

GENERAL

20 A CONTROLLED TRIAL OF TAUROLIN IN ESTAB-
LISHED BACTERIAL PERITONITIS. (Eng.)
owne, M. K.; MacKenzie, M.; Doyle, P. J. (Monk-
nds District General Hosp., Airdrie, Scotland).
rg. Gynecol. Obstet.* 146(5):721-724; 1978.

double-blind controlled trial of taurolin was
dertaken to assess its therapeutic usefulness in
ritonitis. For ethical reasons, the trial was
stopped as soon as a statistical difference between the two groups emerged. The trial solutions contained either 2% taurolin in 5% polyvinylpyrrolidone or 5% polyvinylpyrrolidone alone, both in normal saline. Patients entered the trial if, at operation, they had gross peritonitis or frank fecal soiling and were then shown to have positive swab cultures in Stuart's transport medium. Up to 200 ml of the randomly chosen test solution (coded A or B) was

instilled prior to closure of the abdomen or afterward via a tube drain. An additional 200 ml could be instilled daily, if required, for up to 7 days. When only 35 patients had entered the trial, solution B proved statistically superior, so the code was broken, and it was confirmed that solution B contained taurolin. A normal recovery with normal wound healing and no sepsis was taken as a good result, and all other outcomes were classified as bad. By this criterion, solution B was statistically more beneficial than solution A ($p<0.01$). The choice of antibiotics was ruled out as having influenced the outcomes. Of 17 patients in group A, 3 died (one of massive pulmonary embolus, causing his removal from the analysis); there were no deaths among the 18 patients in group B. There was a tendency for older patients and women to respond poorly, but neither difference was significant. The morbidity was 39% in group B and 70% in group A. The treatment of severe peritonitis is briefly reviewed. Taurolin is an intraperitoneal antiseptic at least as effective as noxytiolin and easier to use clinically; even in small doses it has a significant effect on morbidity, if not on mortality, over and above powerful antibiotics. It appears to be nontoxic.

7221 CIMETIDINE IN THE MANAGEMENT OF THE ZOLLINGER-ELLISON SYNDROME. (Eng.) Larkworthy, W.; Davies, H. L. (RAF Hosp., Nocton Hall, Nocton, Lincoln, England). *Postgrad. Med. J.* 53 (1626):749-750; 1977.

The case of a patient with the Zollinger-Ellison syndrome who was treated from the outset and continuously for over a year with cimetidine is reported. The patient, a 70-yr-old man, presented with dyspepsia, vomiting, and diarrhea that had occurred in increasingly severe episodes since he had undergone vagotomy and partial gastrectomy 4 yr earlier; the operation had been carried out because of evidence of pyloro-duodenal ulceration, but a carcinoid tumor was found in the pyloro-duodenal region. Endoscopy revealed severe inflammation and multiple ulcers in the lower esophagus and stomach. A giant ulcer involved much of the anterior wall of the stomach and there was also a deep penetrating ulcer of the posterior wall. The gastrectomy stoma was ulcerated throughout its circumference. Basal gastric secretion studies showed a volume of 320 ml/hr and acid secretion of 28.8 nmol/hr. After the patient developed melena and a partial thickness myocardial infarct, cimetidine therapy (200 mg 3 times/day and 400 mg at night) was started. Within 20 min of taking the first tablet, his symptoms disappeared and have not returned. Marked endoscopic improvement was observed as early as 1 month after therapy was begun, with healing of esophageal, gastric, and stomal ulcers.

7222 SURGERY IN 1977. (Fre.) Loygue, J. (Hopital Saint-Antoine, 184, rue du Faubourg-St-Antoine, 75571 Paris Cedex 12, France). *Rev. Prat.* 28(5):333-343, *passim;* 1978.

7223 INDICATIONS OF MECHANICAL STAPLING METHODS IN SURGERY OF THE GASTROINTESTINAL TRACT. SURGICAL RESULTS IN 300 CASES. (Ger.) Rinecker, H. (Chirurgische Klinik Dr. Rinecker, Isartalstrasse 82, D-8000 Munich 70, W. Germany). *Chirurg* 48(4): 241-246; 1977.

7224 THE APPLICATIONS OF THE SUCTION PROBE. (Ger.) Arlt, B.; Schlenkhoff, D.; Arlt, E. (Marienhospital, Holkeskampring 40, 4690 Herne 1, W. Germany). *Therapiewoche* 27(51):9313-9315; 1977.

7225 DISTURBANCE IN SOME METABOLIC PROCESSES IN ACUTE SURGICAL DISEASES OF THE ABDOMINAL ORGANS, COMPLICATED BY PERITONITIS. (Rus.) Kovalev, M. M.; Shevchenko, V. S.; Khachatrian, G. K. (Dept. Hosp. Surgery, Kiev Medical Inst., Kiev, USSR). *Vrach. Delo* (8):92-96; 1977.

7226 EXTRA-INTESTINAL DISEASES AND GASTROINTESTINAL DISEASES. (Ger.) Koch, W.; Gerhard, K. H. (Medizinische Poliklinik, Klinikstrasse 8, 8700 Wurzburg, W. Germany). *Therapiewoche* 27(48):8742-8748, *passim*; 1977.

7227 VASCULAR ANOMALIES IN THE DIGESTIVE TRACT. (Ger.) Lux, G.; Fruhmorgen, P.; Rosch, W. (Medizinische Universitatsklinik, Krankenhausstr. 12, D 8520 Erlangen, W. Germany). *Z. Gastroenterol.* 15(10):605-606; 1977.

7228 GASTROINTESTINAL HORMONES AND GASTROINTESTINAL DYSFUNCTION. (Ger.) Feurle, G. E. (Medizinische Universitatspoliklinik, Hospitalstrasse 3, 6900 Heidelberg, W. Germany). *Therapiewoche* 27(37):6385-6386; 1977.

7229 IMMUNOGLOBULIN DEFECTS AND GASTROINTESTINAL DISORDERS. (Nor.) Stray, N. (Sentralsykehuset, Medisinsk avdeling, Akershus, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):19-21; 1978.

7230 PSYCHOSOMATIC ASPECTS OF FUNCTIONAL GASTROINTESTINAL DISEASES. (Ger.) Haesler, L. (Deutsche Klinik fur Diagnostik, Aukammallee 33, 6200 Wiesbaden, W. Germany). *Therapiewoche* 27(37): 6417-6424, *passim*; 1977.

7231 ALIMENTATION IN GASTROINTESTINAL DYSFUNCTION. (Ger.) Knick, B. (Deutsche Klinik fur Diagnostik, Aukammallee 33, 6200 Wiesbaden, W. Germany). *Therapiewoche* 27(37):6404-6410, *passim*; 1977.

7232 DIETETIC USE OF PREPARATIONS NORMALIZING THE INTESTINAL FLORA IN CHILDREN: EXPERIENCE AND PROSPECTS. (Rus.) Blokhina, I. N.; Zhukova, N. P.; Faerman, N. N. (Gor'kii Scientific es. Inst. Epidemiology and Microbiology, Gor'kii, SSR). *Pediatriia* (7):47-51; 1977.

233 ASSESSMENT OF CHANGES OF CARBOHYDRATE METABOLISM IN CHILDREN WITH DISEASES OF E GASTROINTESTINAL TRACT AND THE LIVER. (Rus.) senieva, E. N. (Dept. Pediatrics, N. I. Pirogov cond Moscow Medical Inst., Moscow, USSR). *pr. Okhr. Materin. Det.* 22(2):20-22; 1977.

34 CONTINUOUS GASTROINTESTINAL INFUSION IN CHILDREN. TECHNIQUE AND INDICATIONS IN 0 CASES BETWEEN 1969 AND 1975. (Fre.) Ricour, ; Duhamel, J. F.; Nihoul-Fekete, C. (Hopital des fants-Malades, 149, rue de Sevres, 75730 Paris dex 15, France). *Arch. Fr. Pediatr.* 34(2):154-0; 1977.

35 ZINC DEFICIENCY AND IMMUNOPATHOLOGICAL CHANGES IN THE PATHOGENESIS OF ACRODERMA-TIS ENTEROPATHICA. (Hun.) Endre, L.; Katona, ; Gyurkovits, K.; Szabo, E. (Gyermekklinika, egedi Orvostudomanyi Egyetem, Szeged, Hungary). *v. Hetil.* 118(34):2033-2035; 1977.

7236 REHYDRATION IN CHOLERA AND OTHER DIARRHOEAL DISEASES. (Eng.) Bryceson, A. D. M. (Hosp. Tropical Diseases, London N.W.1, England). *Proc. R. Soc. Lond.* [*Biol.*] 199(1134):109-114; 1977.

7237 CORPORA AMYLACEA IN ADENOLYMPHOMA (WARTHIN'S TUMOR). (Eng.) David, R.; Buchner, A. (Sackler Sch. Medicine, Tel Aviv Univ., Ramat-Aviv, 61999, Israel). *Am. J. Clin. Pathol.* 69(2):173-175; 1978.

7238 Escherichia coli GASTRO-ENTERITIS IN ADULTS. (Eng.) Robins-Browne, R. M.; Jacobs, M. R.; Koornhof, H. J. (Dept. Microbiology, Univ. Witwatersrand, Johannesburg, South Africa). *S. Afr. Med. J.* 53(3):93-94; 1978.

See also, 6594, 6739, 6755, 6756, 6768, 6769, 6785, 6791, 6792, 6798, 6806, 6817, 6824, 6830, 6839, 6844, 6849, 6864, 6912, 6919, 6956, 6960, 6963, 6994, 7002, 7003, 7007, 7024, 7040, 7056, 7104, 7114, 7120, 7157, 7203, 7240.

GENERAL

Parasitology

39 SEROLOGIC DIAGNOSIS OF EXTRAINTESTINAL AMEBIASIS: A COMPARISON OF STICK-ELISA OTHER IMMUNOLOGICAL TESTS. (Eng.) Felgner, (Bernhard-Nocht-Institut fur Schiffs- und Tropen-nkheiten, Bernard-Nocht-Str. 74, 2000 Hamburg W. Germany). *Tropenmed. Parasitol.* 28(4):491-; 1977.

value of the heterogenous enzyme-linked immuno-bent assay (ELISA) in the diagnosis of amebiasis compared with that of complement fixation, in-ect hemagglutination, counterelectrophoresis, latex agglutination in 37 patients with amebic er abscesses and in 20 healthy controls. The ctivity of all sera from the patients exceeded t of the controls in ELISA. There was a positive relation between the extinction values of ELISA the results of indirect hemagglutination and nterelectrophoresis at the 1% level. These re-ts confirm that extraintestinal amebiasis can diagnosed with ELISA.

0 AMEBIC PERITONITIS FOLLOWING RUPTURE OF AN AMEBIC LIVER ABSCESS: SUCCESSFUL ATMENT OF TWO PATIENTS. (Eng.) Wallace, R. J., ; Greenberg, S. B.; Lau, J. M.; Kalchoff, W. Mangold, D. E.; Martin, R. R. (Baylor Coll. Medicine, Houston, TX 77030). *Arch. Surg.* 113(3): 322-325; 1978.

The cases of two patients who were successfully treated for amebic peritonitis secondary to rupture of an undiagnosed liver abscess are presented together with a clinical discussion of this complication of hepatic amebiasis. A 37-yr-old man with no history of liver disease presented with fever, dark urine, intermittent right-sided abdominal pain, distended abdomen, decreased bowel sounds, and mild scleral icterus. Abdominal roentgenograms revealed scattered loops of small bowel and a ground glass appearance of ascites. When his condition deteriorated (elevated pulse and temperature, increased pain, disorientation), an exploratory laparotomy revealed a ruptured abscess of the inferior portion of the right lobe of the liver. Numerous trophozoites of *Entameba histolytica* were present in biopsy specimens. Treatment consisted of drainage of the abscess and abdomen, emetine (65 mg/day, i.m. for 6 days), clindamycin and gentamicin for 48 hr, and metronidazole (750 mg, p.o., t.i.d. for 6 days after emetine was discontinued). The patient became asymptomatic, although at 6 months his liver scan was still abnormal. A 36-yr-old man presented with fever, malaise, right-shoulder pain, watery diarrhea, severe right lower quadrant abdominal pain, and diminished bowel sounds. A chest roentgenogram revealed a probable pleural effusion with elevation of the right hemidiaphragm. Exploratory laparotomy revealed a ruptured hepatic abscess in the superior portion of the right lobe; the abscess and abdomen were drained. Because insufficient tissue was available for histological evaluation of amebic involvement, a serum sample was assayed by counterimmunoelectrophoresis and was positive for precipitins to *E. histolytica*. Treatment consisted of clindamycin and gentamicin for 48 hr and emetine (65 mg/day, i.m., for 6 days) followed by metronidazole (750 mg, p.o., t.i.d. for 8 days). The patient was asymptomatic at 3 months with a minimally abnormal liver scan. The diagnosis of amebic liver abscess should be considered in anyone with a suspected liver abscess, jaundice, or diarrhea in whom peritonitis develops, especially in a patient who has been to Mexico. The optimal therapy for amebic peritonitis is unproved. Surgical intervention is often necessary. Emetine alone or followed by metronidazole after surgical drainage is presently the treatment of choice.

7241 ASCARIASIS. (Eng.) Pawlowski, Z. S. (Medical Acad. Poznan, Poznan, Poland). *Clin. Gastroenterol.* 7(1):157-178; 1978.

7242 STRONGYLOIDIASIS. (Eng.) Filho, E. C. (Univ. Virgina Sch. Medicine, Charlottesville, VA). *Clin. Gastroenterol.* 7(1):179-200; 1978.

7243 Oxyuris, Trichostrongylus AND Trichuris. (Eng.) Wolfe, M. S. (George Washington Medical Sch., Washington, DC). *Clin. Gastroenterol.* 7(1):201-217; 1978.

7244 OTHER NEMATODES. (Eng.) Marsden, P. D. (Faculdade de Ciencias da Saude, Univ. Brasilia, Brasilia, Brazil). *Clin. Gastroenterol.* 7(1):219-229; 1978.

7245 HYDATID DISEASE OF THE LIVER EVALUATED BY COMPUTED TOMOGRAPHY. (Eng.) Kirschner, L. P.; Ferris, R. A.; Mero, J. H.; Moss, M. L. (Commonwealth Doctors Hosp., 4315 Chain Bridge Rd., Fairfax, VA 22030). *J. Comp. Assisted Tomogr.* 2(2):229-230; 1978.

7246 ECHINOCOCCAL CYST OF THE LIVER SEEN ON COMPUTED TOMOGRAPHY. (Eng.) Newmark, H., III; Smith, J. J.; Burrows, R.; Silberman, E. L. (Century City Hosp., 2070 Century Park East, Los Angeles, CA 90067). *J. Comp. Assisted Tomogr.* 2(2):231-232; 1978.

7247 SURGICAL COMPLICATIONS OF LEPTOSPIROSIS IN CHILDREN. (Eng.) Bell, M. J.; Ternberg, J. L.; Feigin, R. D. (St. Louis Children's Hosp., 500 S. Kingshighway, St. Louis, MO 63110). *J. Pediatr. Surg.* 13(3):325-330; 1978.

7248 BILIARY TRACT DYSFUNCTION IN GIARDIASIS. (Eng.) Goldstein, F.; Thornton, J. J.; Szydlowski, T. (Lankenau Hosp., Philadelphia, PA 19151). *Am. J. Dig. Dis.* 23(6):559-560; 1978.

7249 GIARDIASIS: ASSOCIATION WITH HOMOSEXUALITY. (Eng.) Schmerin, M. J.; Jones, T. C.; Klein, H. (New York Hosp.-Cornell Medical Center, New York, NY). *Ann. Int. Med.* 88(6):801-803; 1978.

7250 BILIARY ASCARIASIS--ENDOSCOPIC ASPECTS: REPORT OF 4 CASES. (Eng.) Van Der Spuy, S. (Livingstone Hosp., Port Elizabeth, South Africa). *S. Afr. Med. J.* 53(25):1030-1033; 1978.

7251 FULMINANT HEPATIC FAILURE SECONDARY TO AMEBIC ABSCESSES. (Eng.) Saltzman, D. A.; Smithline, N.; Davis, J. R. (Univ. Arizona Sch. Medicine, Tucson, AZ 85724). *Am. J. Dig. Dis.* 23(6):561-567; 1978.

7252 THE MANAGEMENT OF AMOEBIC HEPATIC ABSCESS. (Eng.) Perez, J. Y., Jr. (Santo Tomas Univ. Hosp., Suite 220, Espafia St., Manila, Philippines). *Drugs* 15(Suppl. 1):49-52; 1978.

7253 SURGICAL DRAINAGE OF AMOEBIC ABSCESS OF THE LIVER. (Eng.) Nuguid, T. P. (Dept. Surgery, Far Eastern Univ., Manila, Philippines). *Drugs* 15(Suppl. 1):53-57; 1978.

7254 INTESTINAL NEMATODES OF MAN. (Eng.) Zama
V. (Faculty Medicine, Univ. Singapore, Sep
Lines, Singapore-3). *Drugs* 15(Suppl. 1):63-69; 197

7255 TREATMENT OF MULTIPLE INTESTINAL HELMINTHIASIS WITH OXANTEL AND PYRANTEL. (Eng.)
Garcia, E. G. (Inst. Public Health, Univ. Philippine
System, Manila, Philippines). *Drugs* 15(Suppl. 1):7
72; 1978.

7256 A COMPARATIVE TRIAL OF OXANTEL-PYRANTEL AND MEBENDAZOLE IN MULTIPLE HELMINTH INFECTION IN SCHOOL CHILDREN. (Eng.) Dissanaike, A. S. (Faculty Medicine, Univ. Malaya, Kuala Lumpur
Malaysia). *Drugs* 15(Suppl. 1):73-77; 1978.

7257 OXANTEL-PYRANTEL IN VARIOUS REGIMENS FOR THE TREATMENT OF SOIL TRANSMITTED HELMINTHIASIS IN RURAL AND URBAN COMMUNITIES. (Eng.) Cabrera, B. D.; Sy, F. S. (Inst. Public Health, Univ. Philippines System, 625 Pedro Gil St., Ermita, Manila, Philippines). *Drugs* 15(Suppl. 1):78-86; 1978.

7258 A REVIEW OF TRICHURIASIS, ITS INCIDENCE, PATHOGENICITY AND TREATMENT. (Eng.)

Chanco, P. P., Jr.; Vidad, J. Y. (Faculty Medicine and Surgery, Univ. Santo Tomas, Philippines). *Drugs* 15(Suppl. 1):87-93; 1978.

7259 A COMPARATIVE STUDY OF THE EFFECT OF OXANTEL-PYRANTEL SUSPENSION AND MEBENDAZOLE IN MIXED INFECTIONS WITH Ascaris AND Trichuris. (Eng.) Lee, S. H.; Lim, J. K. (Coll. Medicine, Chung-Ang Univ., Seoul 151, South Korea). *Drugs* 15(Suppl. 1):94-98; 1978.

7260 ANTHELMINTHIC EFFECT OF OXANTEL AND OXANTEL-PYRANTEL IN INTESTINAL NEMATODE INFECTIONS. (Eng.) Lim, J. K. (Coll. Medicine, Seoul Natl. Univ., Seoul, South Korea). *Drugs* 15(Suppl. 1):99-103; 1978.

See also, 6721, 6779, 7095, 7112, 7229.

GENERAL

Regional Enteritis

7261 ABNORMAL GALLIUM SCAN IN REGIONAL ENTERITIS. (Eng.) Joo, K. G.; Landsberg, R.; Parthasarthy, K. L.; Bakshi, S. P. (Buffalo General Hosp., Buffalo, NY). *Clin. Nucl. Med.* 3(4):134-136; 1978.

A report of abnormal gallium scan in a case of regional enteritis is presented. A 41-yr-old woman presented with fever, intractable diarrhea, anorexia, and frequent abdominal cramps of 3 months' duration. She had lost 20 lb., was pale and weak, and had a diffusely tender abdomen. A bone marrow biopsy revealed active hematopoiesis and prominent granulocytic hyperplasia without evidence of tumor and the patient was suspected of having regional enteritis. A gallium scan was performed to rule out lymphoma. Two successive scans showed intense uptake of ^{67}Ga in the pelvis as a large, well-circumscribed area of abnormal accumulation, confirming the presence of an inflammatory and/or neoplastic pelvic disease. Radiologic examination of the small bowel demonstrated multiple dilatations of the ileum with interspersed segmental narrowing, cobblestone mucosal pattern, and some areas of vertical ulceration. These changes were most prominent in the terminal ileum, indicating regional enteritis. The site of the abnormal ^{67}Ga uptake corresponded to the ileal lesions seen on the small bowel x-ray. The patient responded to i.v. ACTH and antibiotics, which were replaced after 10 days by p.o. prednisone. Gallium scanning appears to be a useful procedure in evaluating patients with granulomatous inflammation, especially regional enteritis, and it may prove helpful in identifying actively involved sites of disease.

7262 INHERITED DEFICIENCY OF SECOND COMPONENT OF COMPLEMENT AND HLA HAPLOTYPE A10,B18 ASSOCIATED WITH INFLAMMATORY BOWEL DISEASE. (Eng.) Slade, J. D.; Luskin, A. T.; Gewurz, H.; Kraft, S. C.; Kirsner, J. B.; Zeitz, H. J. (Rush Medical Coll., Chicago, IL). *Ann. Intern. Med.* 88(6):796-798; 1978.

Histocompatibility locus antigen studies and studies of the complement system were carried out in a patient with C2 deficiency, inflammatory bowel disease, sacroiliitis, and haplotypes A10,B18 and Aw32,B18 at the major histocompatibility locus and in a family in which all three members had severe inflammatory bowel disease and two had the A10,B18 haplotype. In the patient, serum total complement and C2 hemolytic complement activities were undetectable; levels of the remaining C1-C9 components were normal. The parents, both siblings, and a child of this patient each had half-normal levels of C2 and either the A10,B18 or the Aw32,B18 HLA haplotype. In a second unrelated family, an only child and both parents developed inflammatory bowel disease. The father and child had HLA haplotype A10,B18, but, along with the mother, each had normal serum levels of hemolytic C and C2. Homozygous C2 deficiency, often in association with the A10,B18 haplotype, has previously been linked with various autoimmune diseases and with propensity to infection. The present findings suggest that C2 deficiency or this haplotype also may predispose to inflammatory bowel diseases.

7263 MALIGNANT LYMPHOMA COMPLICATING REGIONAL ENTERITIS: CASE REPORT AND REVIEW OF THE LITERATURE. (Eng.) Collins, W. J. (St. Joseph Hosp., 1100 W. Stewart Dr., Orange, CA 92668). *Am. J. Gastroenterol.* 68(2):177-181; 1977.

The case of a patient with malignant lymphoma complicating regional enteritis is presented and the relevant literature is reviewed. The patient, a 63-yr-old man, had 9 yr of clinical symptoms and small bowel x-ray changes involving more than 50 cm of ileum and considered diagnostic of regional enteritis. At laparotomy, a segment of ileum was found to be adherent to the sigmoid colon, and fistulous tracts were identified. There was also recent free ileal perforation with peritoneal fecal soiling. The diseased segment and a portion of the cecum were removed surgically, and the histological features of the resected tissue included infiltration of a thickened bowel wall with acute and chronic inflammatory cells including numerous lymphocytes as well as some large histiocytes. The inflammatory changes were interpreted as regional enteritis with an associated peritonitis secondary to fecal spillage. The patient subsequently developed right upper quadrant tenderness and hypotension, a subhepatic abscess, a fistulous tract between the common bile duct and right upper quadrant surgical incision site, pyrexia, and massive gastrointestinal bleeding. A malignant lymphoma of the mixed histiocytic-lymphocytic type was diagnosed after the examination of another segment of ileum and colon. This is the sixth case in which malignant lymphoma developed in small intestine involved with regional enteritis. The duration of illness in this patient is incompatible with a diagnosis of lymphoma, as published series of untreated primary small intestinal lymphomas do not have 5-yr survivals.

7264 VIRAL AGENTS IN CROHN'S DISEASE. (Eng.) Riemann, J. F. (Medizinische Klinik mit Poliklinik der Universitat, Krankenhausstr. 12, D-8520 Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):403-404; 1977.

7265 THE MIDLINE INCISION IN PATIENTS WITH CROHN'S DISEASE. (Eng.) Poticha, S. M. (Northwestern Univ. Medical Center, Chicago, IL). *Surg. Gynecol. Obstet.* 146(3):435-436; 1978.

7266 CIRCULATING IMMUNE COMPLEXES IN CROHN'S DISEASE: EFFECT OF MEDICAL AND SURGICAL TREATMENT [Abstract]. (Eng.) Fiasse, R.; Lurhuma, A. Z.; Cambiaso, C. L.; Masson, P. L.; Dive, C. (Service de Gastro-enterologie, Universite de Louvain, Av. Hippocrate 10, B-1200 Bruxelles, Belgium). *Digestion* 16(1/2):210-211; 1977.

7267 THE PATHOGENESIS OF CROHN'S DISEASE. (Eng.) Ward, M. (Royal Brisbane Hosp., Herston Rd., Brisbane, Queensland 4029, Australia). *Lancet* 2(8044):903-905; 1977.

7268 MURAMIDASE (LYSOZYME) IN CROHN'S DISEASE AND IN ULCERATIVE COLITIS. (Eng.) Pruzanski, W.; Marcon, N.; Ottaway, C.; Prokipchuk, E. (Wellesley Hosp., Toronto, Ontario M4Y 1J3, Canada). *Am. J. Dig. Dis.* 22(11):995-998; 1977.

7269 ENTEROVENOUS FISTULIZATION IN CROHN'S DISEASE. (Eng.) Reiner, L.; Freed, A.; Bloom, A. (Bronx-Lebanon Hosp. Center, 1276 Fulton Ave., Bronx, NY 10456). *JAMA* 239(2):130-132; 1978.

7270 LOCALIZED GIANT PSEUDOPOLYPOSIS OF THE COLON IN GRANULOMATOUS COLITIS: A CASE REPORT AND REVIEW OF THE LITERATURE. (Eng.) Ayre-Smith, G. (Vancouver General Hosp., 855 W. 12th Ave., Vancouver, British Columbia VS2 1M9, Canada). *Br. J. Radiol.* 50(600):916-917; 1977.

See also, 6978, 6979, 7021, 7022, 7027.

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

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GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

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The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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LANGUAGE ABBREVIATIONS

Afrikaans	Afr.	Georgian	Geo.	Persian	Per.
Albanian	Alb.	German	Ger.	Polish	Pol.
Arabic	Ara.	Greek	Gre.	Portuguese	Por.
Armenian	Arm.	Hausa	Hau.	Pushto	Pus.
Azerbaijani	Aze.	Hebrew	Heb.	Rumanian	Rum.
Belorussian	Bel.	Hindi	Hin.	Russian	Rus.
Bengali	Ben.	Hungarian	Hun.	Serbian	Ser.
Bulgarian	Bul.	Icelandic	Ice.	Slovak	Slo.
Burmese	Bur.	Indonesian	Ind.	Slovene	Slv.
Chinese	Chi.	Interlingua	Int.	Spanish	Spa.
Croatian	Cro.	Italian	Ita.	Swahili	Swa.
Czechoslovakian	Cze.	Japanese	Jpn.	Swedish	Swe.
Danish	Dan.	Kirghiz	Kir.	Tagalog	Tag.
Dutch	Dut.	Korean	Kor.	Tamil	Tam.
English	Eng.	Latin	Lat.	Telugu	Tel.
Esperanto	Esp.	Latvian	Lav.	Thai	Tha.
Estonian	Est.	Lithuanian	Lit.	Turkish	Tur.
Finnish	Fin.	Marathi	Mar.	Ukranian	Ukr.
Flemish	Fle.	Masai	Mas.	Urdu	Urd.
French	Fre.	Multilingual	Mlt.	Vietnamese	Vie.
Gaelic	Gae.	Norwegian	Nor.	Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
amp	ampere
ATP	adenosine triphosphate
A	angstrom
BSP	sulfobromophthalein
C	degrees centigrade
cal	calories
cc	cubic centimeter
cm	centimeter(s)
dl	deciliter
DNA	deoxyribonucleic acid
ED_{50}	median effective dose(s)
EDTA	ethylenediamine tetraacetic acid
e.g.	for example
EEG	electroencephalogram
ESR	erythrocyte sedimentation rate
g	gram(s)
μg	microgram(s)
Hz	Hertz
hr	hour(s)
Ig	immunoglobulin(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kcal	kilocalorie(s)
kg	kilogram(s)
K_m	Michaelis constant
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar; mole(s)
mM	millimolar; millimole(s)
μM	micromolar; micromole(s)
ma	milliampere(s)
mCi, μCi	milli-, microcurie(s)
mEq	milliequivalent(s)
mg	milligram(s)
ml, μl	milli-, microliter(s)
mm	millimeter(s)
mOsm	milliosmolar; milliosmeter(s)
msec	millisecond(s)
mV	millivolt(s)
min	minute(s)
MTD	maximum tolerated dose
NAD	nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotidephosphate
NADPH	reduced nicotinamide adenine dinucleotidephosphate
ng	nanogram (10^{-9})
nm	nanometer(s)
Pa	ambient pressure
PAS	periodic acid - Schiff
pg	picogram (10^{-12})
pgEq	picogram equivalent(s)
p.o.	orally
ppb	parts per billion
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
V	volt
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

71 EVIDENCE FOR ARTERIOVENOUS COMMUNICATIONS IN THE GASTROINTESTINAL TRACT. (Eng.)
eonard, J. J.; Emery, R. W.; Einzig, S.; Nicoloff,
. M.; Fox, I. J. (Univ. Minnesota Medical Sch.,
inneapolis, MN). *Surg. Forum* 28:419-421; 1977.

study was carried out in 17 mongrel dogs to
etermine whether arteriovenous communications
VCs) less than 15 μm in size exist in the
astrointestinal tract and, if so, their ef-
ect on gastrointestinal blood flow measurement
a radionuclide-labeled microsphere technique.
ne anesthetized dogs were placed on positive-
essure ventilation, and 10^6 15-μm ^{85}Sn- and 7
10^6 8-μm ^{46}Sc-labeled microspheres were injected
multaneously into the left atrium via a catheter
ile a reference sample was withdrawn from the
rta at a constant rate. After sacrifice, the
astrointestinal organs were excised at 2 min
roup 1, 6 dogs), 15 min (group 2, 5 dogs), or
min (group 3, 6 dogs) following microsphere
jection, and gastrointestinal blood flow measured
the aortic reference sample technique in 1.0-
15-g organ samples. The mean aortic pressure,
eart rate, pH, PO_2, and PCO_2 were similar in all
ree groups. Flow values for the 8-μm micro-
heres were 25-70% (average 48%) lower than
lues for the 15-μm microspheres for all gastro-
testinal organs except the spleen and pancreas,
dicating the early traversal of the smaller
crospheres across the microcirculation in all
t those two organs, with lodgment of these micro-
heres in the liver. The flow rate of 8-μm micro-
heres was much higher than that of 15-μm micro-
heres in the liver (58 versus 21 ml/min/100 g),
dicating traversal across the mesenteric micro-
rculation by the 8-μm microspheres. The re-
lts indicate the presence of AVCs <15 μm in
ze in gastrointestinal organs other than the
ncreas and spleen, regardless of whether these
e normal capillaries or arteriovenous anasto-
ses.

72 LUMINAL DILATATION AND MORPHOLOGIC CHANGES SECONDARY TO ENTEROTOXINS. (Eng.) Udall,
N.; Alvarez, L. A.; Peterson, D. F.; Nichols, B.
(Dept. Pediatrics, Univ. Arizona, Tucson, AZ
724). *Physiol. Chem. Phys.* 9(2):109-116; 1977.

ne validity of interpreting mucosal changes in
osed intestinal loop models in the presence of
evere distention was tested by studying structural
nanges in ligated rat small intestinal loops ex-
osed to purified cholera enterotoxin. Exposure
ligated loops to 20 μg of cholera enterotoxin
ncreased the fluid content from a control level of
05 ± 0.03 ml to 1.86 ± 0.56 ml ($p<0.001$). These
nterotoxin-exposed loops were microscopically ab-
ormal, many having severe shortening of the villi.
another series of experiments, temporarily li-
ated intestinal loops were exposed to cholera enterotoxin, the ligature was removed after 15 min, and the abdominal wall sutured. The animal was sacrificed after 5-6 hr, and a large-bore needle and syringe were used to aspirate open loop luminal fluid from each animal. The average volume of luminal fluid from the controls in the open loop system was 0.3 ± 0.2 ml, whereas that in the enterotoxin-exposed animals was 1.3 ± 0.3 ml ($p<0.005$). The morphology of enterotoxin-exposed loops and control loops were normal. These studies show that distention secondary to increased luminal fluid causes artifactual histologic damage, which questions the validity of interpreting mucosal changes in closed intestinal loop models in the presence of severe distention. The open loop model described eliminates distention as a cause of histologic changes.

7273 THE ULTRASTRUCTURE OF RAT INTESTINAL EPITHELIUM AS REVEALED BY CRYOULTRAMICROTOMY AND TRANSMISSION ELECTRON MICROSCOPY. (Eng. Johnson, I. T.; Bronk, J. R. (Dept. Biology, Univ. York, Heslington, York YO1 5DD, England). *Micron* 8(3):139-143; 1977.

Rat jejunal mucosa, rapidly frozen without the use of cryoprotectants, was sectioned by cryoultramicrotomy and examined by transmission electron microscopy to determine whether this technique is suitable for the study of intestinal transport. The quality of the sections varied with their morphological origin, but acceptable preservation of ultrastructure was obtained near the extremities of the villi. The "ripple" artifact was visible in some sections, and in other sections, the "knitting" artifact, thought to be due to ice-crystal formation, was seen. The brush borders were not disrupted, but they did not exhibit the very ordered appearance with clearly defined microvilli seen in conventionally prepared material. In many areas, the microvilli appeared to be fused into an amorphous layer, and only where some separation occurred was it possible to distinguish them individually. This appeared to be due to the presence of a substantial mucous coat. It is concluded that this procedure is satisfactory as long as the grids are not exposed to the atmosphere for more than a few minutes, which results in artifacts.

7274 A RECONSIDERATION OF THE ISCHIORECTAL FOSSA. (Eng.) Hammer, R. P., Jr.; Shrewsbury, M. M. (Univ. California, Center Health Sciences, Los Angeles, CA). *Dis. Colon Rectum* 20(8):681-689; 1977.

7275 ELECTRON MICROSCOPIC STUDIES OF EXPERIMENTAL *Entamoeba histolytica* INFECTION IN THE GUINEA PIG. III. HISTOLYSIS OF THE CECUM. (Eng.) Takeuchi, A.; Jervis, H. R.; Phillips, B.

P. (Walter Reed Army Inst. Res., Washington, DC 20012). *Virchows Arch.* [*Cell Pathol.*] 24(4):263-277; 1977.

7276 DIFFERENT PARTICLE TYPES IN TISSUE CULTURE AND INTESTINAL EPITHELIUM INFECTED WITH ROTAVIRUS. (Eng.) Chasey, D. (Central Veterinary Lab., New Haw, Weybridge, Surrey KT15 3NB, England). *J. Gen. Virol.* 37(3):443-451; 1977.

7277 ISOLATION AND CHARACTERIZATION OF A LIVER-SPECIFIC ANTIGEN (F-Ag) FROM HUMAN LIVER. (Eng.) Mihas, A. A.; Saccomani, G.; Tomana, M.; Spenney, J. G. (Div. Gastroenterology, Univ. Alabama in Birmingham, Birmingham, AL 35294). *Immunochemistry* 14(11/12):727-731; 1977.

7278 EPITHELIAL MITOTIC ACTIVITY IN EXPERIMENTAL GASTRIC WOUNDS. (Eng.) Adair, H. M. (Royal Coll. Surgeons of England, London WC2A 3PN, England). *J. Anat.* 125(2):401-407; 1978.

7279 LIVER VOLUME DETERMINATION BY ULTRASONIC SCANNING. (Eng.) Rasmussen, S. N. (Herlev Hosp., 2730 Herlev, Copenhagen, Denmark). *Dan. Med. Bull.* 25(1):1-45; 1978.

7280 FUNCTIONAL ANATOMY OF THE PORTAL VEIN AND ITS MAIN AND SEGMENTAL BRANCHES IN THE ADULT MAN. (Eng.) Ferraz de Carvalho, C. A.; Junqueira Rodrigues, C. (Departamento de Anatomia, Universidade de Sao Paulo, Av. Dr. Arnaldo 455, Cx. Postal 2921, Sao Paulo, Brazil). *Anat. Anz.* 143(1):50-71; 1978.

See also, 7285, 7308, 7310, 7346, 7352, 7353, 7356, 7387, 7438, 7449, 7463, 7495, 7850, 7933, 7936.

ABSORPTION - EXCRETION - TRANSPORT

7281 ELECTRICAL PACING INCREASES JEJUNAL ABSORPTION OF WATER, GLUCOSE, AND SODIUM. (Eng.) Collin, J.; Kelly, K. A.; Phillips, S. F. (Mayo Foundation, Rochester, MN). *Surg. Forum* 28:428-430; 1977.

To determine whether absorption from a segment of small bowel could be increased by backward electrical pacing, a 75-cm segment of proximal jejunum was isolated in each of three mongrel dogs, and the two ends of the segment were fashioned as separate stomas on the anterior abdominal wall. After recovery, each conscious fasted dog was tested on six separate occasions. The test consisted of a 50-g liver meal to induce a fed pattern of intestinal electrical activity, continuous infusion (2.9 ml/min) into the proximal stoma of a glucose (100 mM) plus NaCl (90 mEq/l) solution, and three 30-min periods of measurement in each of which the transit time of a 1-ml bolus of ^{14}C-polyethylene glycol through the loop was determined and in the second of which the segment was driven backward electrically. The electrical stimuli always produced entrainment and backward propagation of pacesetter potentials at the stimulated frequency (16.2/min). The mean time required for transit of 20% of the bolus was significantly longer ($p<0.05$) during pacing than it was either before or after. In each dog, the output of water and the total amount of glucose and sodium collected from the distal stoma were significantly less during pacing than they were either before or after pacing ($p<0.001$-0.02). Backward electrical pacing slows transit time through and increases absorption of water, glucose, and sodium from the isolated canine jejunal segment. This finding may have therapeutic applications in patients with the short bowel syndrome.

7282 CONTRIBUTION OF DIFFUSIVE PATHWAY IN INTESTINAL ABSORPTION OF GLUCOSE IN RAT UNDER NORMAL FEEDING CONDITION. (Eng.) Murakami, E.; Saito, M.; Suda, M. (Sch. Medicine, Ehime Univ., Shigenobu, Onsen-gun, Ehime 791-02, Japan). *Experientia* 33(11):1469-1470; 1977.

The contribution of passive transport in glucose absorption was studied in male Wistar rats by investigating the relationship between the luminal glucose concentration and the absorption rate of glucose. The small intestinal glucose concentration, determined by a specific enzymatic method, was less than 2 mM before feeding and reached a maximum level of 50 mM after feeding a normal meal (laboratory chow). Glucose absorption was studied *in vivo* by circulating various concentrations of glucose through the lumen of the upper half of the small intestine for 15 min. The contribution of passive absorption was studied by eliminating phlorizin-sensitive active transport by the addition of 0.5 mM phlorizin to the glucose solution. The rate of glucose absorption in the presence of phlorizin increased proportionately with an increase in luminal glucose concentration. The difference between the rates in the absence and pre-

:e of phlorizin was saturable, and the half-
.mal concentration of glucose was about 10 mM.
rate of phlorizin-sensitive absorption was
iter than that of the phlorizin-insensitive
orption up to a glucose concentration of ap-
:imately 35 mM, but above this concentration,
opposite was true. These results suggest that
:ose is absorbed mainly via the active trans-
: system when the luminal concentration is low,
that a larger fraction of glucose is absorbed
ι passive process when the luminal glucose con-
:ration is high.

3 INTESTINAL ABSORPTION OF GLUCOSE FROM ISOLATED MICE JEJUNAL LOOPS IN VIVO: CT OF DIFFERENT DERIVATIVES OF TETRACYCLINES.

.) DuHa, S.; Basu, P. S.; Banerjee, S. (Dey's
cal Stores [Manufacturing] Ltd., Calcutta 700
India). *Indian J. Exp. Biol.* 15(6):452-454;
.

effect of different derivatives of tetracyclines
he intestinal absorption of glucose was studied
g isolated mice jejunal loops *in vivo* and
ted mice jejunal sacs *in vitro*. Absorption of
ose (3 mg) from 1 ml of buffer with or without
different tetracyclines (250 μg) by jejunal
s containing six mesenteric blood vessels was
ured *in vivo* in control mice and in mice treated
iously for 7 days with daily i.v. injections
5 mg/kg of tetracycline hydrochloride (TH),
etracycline hydrochloride (OTH), chlortetra-
ine hydrochloride (CTH), or demethylchlortetra-
ine hydrochloride (DTH); the same drug was used
oth the pretreatment and the test on any one
e. In the control mice, glucose absorption in
absence of any drug was 19 ± 1.7 mg/g dry in-
ine/hr, and this level was reduced to 10 ± 1.5,
1.9, 8 ± 1.6, and 11 ± 2 mg/g dry intestine/hr
he presence of TH, OTH, CTH, and DTH, resp.,
he buffer. In mice pretreated with a drug,
glucose absorption (in mg/g dry intestine/hr)
he presence of the same drug was 12 ± 1.4,
2, 12 ± 1.4, and 13 ± 2.5 for TH, DTH, CTH,
DTH, resp. The Na$^+$K$^+$-ATPase activity of the
stinal mucosa (in μg inorganic phosphate [Pi]
rated/mg protein/15 min) was 13.3 ± 2.0, 3.5
5, 6.1 ± 0.44, 1.7 ± 0.28, and 3.0 ± 0.17
controls and TH, OTH-, CTH-, and DTH-treated
, resp. In everted jejunal sacs *in vitro*
ed with glucose (3 mg) in 0.3 ml buffer, the
transferance of glucose/g dry intestine/hr
the mucosal to the serosal surface was 34
and the Na$^+$K$^+$-ATPase activity (as μg Pi lib-
ed/mg protein/15 min) was 13.3 ± 0.64; when
250 μg/ml) was added to the glucose solution,
nean transferance was reduced to 21 ± 1.5
.005) and the ATPase activity to 6.3 ± 0.82
.005). The diminished transport of glucose
ouse jejunum after treatment with different
acyclines appears to be due to an insufficient
gy supply as a result of diminished ATPase
vity.

EFFECT OF DIETARY CARBOHYDRATES ON INTESTINAL TRANSPORT AND ACCUMULATION OF ^{59}Fe^{++} IN IRON DEFICIENT RATS.

(Eng.) Chang, Y. O.; Varnell, T. R. (Div. Biochemistry, Univ. Wyoming, Laramie, WY 82071). *Int. J. Vitam. Nutr. Res.* 47(3):292-295; 1977.

Because *in vivo* studies have indicated that the type of dietary carbohydrate influences the intestinal absorption of iron, a study was carried out to investigate this influence on the active transport of ^{59}Fe^{2++} across the wall of isolated small intestinal tissue and the ability of the tissue to accumulate ^{59}Fe^{++}. Six groups of six male Sprague-Dawley rats were fed 69% carbohydrate iron-deficient diets for 3 weeks. The carbohydrates were cornstarch, dextrin, glucose, fructose, sucrose, or a sucrose-lactose mixture, and measurements were carried out in everted duodenal sacs from sacrificed animals that had been fasted for 12 hr. Only the dextrin-fed rats maintained normal hematocrit values ($p<0.05$), and they exhibited the lowest transfer rate ($p<0.05$) and accumulation of iron ($p<0.05$) of all groups. The rats fed fructose also had significantly lower ($p<0.05$) transfer rates and accumulation of radioiron than did the remainder of the experimental groups. The fructose-fed rats had markedly thicker intestinal walls than did the other groups, which may explain the low transfer rate and absorption of radioiron by this group. The low transfer rate and absorption of iron by dextrin-fed rats is more likely due to altered osmotic relationships in the intestinal wall, producing a slower depletion of body iron reserves during the experimental period. Dietary carbohydrate appears to exert a definite effect on iron metabolism that needs to be further defined.

7285 MORPHOLOGICAL APPEARANCE OF FAT IN THE EPITHELIAL CELLS OF DIFFERENT PORTIONS OF THE INTESTINES IN MICE.

(Eng.) Snipes, R. L. (Zentrum fur Anatomie und Cytobiologie, Justus-Liebig-Universitat, D-6300 Giessen, W. Germany). *Experientia* 33(10):1335-1336; 1977.

Fat absorption was studied morphologically in different segments of the mouse small and large intestines. Mice fasted for 2-3 days were force-fed massive doses of commercial triglycerides (vegetable oil, 0.10-0.15 ml/g) over 2-3 days by gastric intubation. Morphologically, fat appeared as small droplets concentrated in the supranuclear region, presumably in the Golgi region, in the epithelial cells of the most proximal portion of the small intestine. In addition, scattered, fine droplets occurred in the apical cell area. Distal to the duodenum (4-20 cm from the pyloric-duodenal junction), an abrupt increase in the content and size of fat droplets was noted. Fat distribution demonstrated a proximal to distal gradient, being greatest in the mid-jejunal area, but less in the duodenum and ileum. In the cecum and proximal colon, a limited number of fat droplets was observed. The authors stress that the criterion of the amount and size of fat droplets in intestinal epithelial cells does not necessarily give a reliable indication of the efficiency of fat absorption in the different intestinal segments.

ABSORPTION - EXCRETION - TRANSPORT

7286 EFFECT OF VITAMIN D_3 ON DUODENAL ABSORPTIVE CELL PLASMA MEMBRANES: FREEZE FRACTURE REPLICATION STUDY. (Eng.) Jande, S. S. (Dept. Anatomy, Ottawa Univ., Ottawa, Canada). *Cytobios* 17(67/68):171-176; 1976.

Since previous studies have suggested that vitamin D produces alterations in the permeability of the plasma membrane and/or modifies the juxta-luminal complexes, chick duodenal absorptive cells were studied by a freeze-fracturing technique to investigate whether vitamin D also alters the plasma membrane. Immediately after hatching, the chicks were fed a vitamin D-deficient diet for 4 weeks. Some were given i.m. injections of 500 IU of vitamin D_3 24 hr prior to removal of the duodenum. In rachitic as well as vitamin D-replete chicks, the fracture faces of the microvillar as well as lateral and basal plasma membranes revealed the typical structures of plasma membranes described earlier. The PF (convex) faces had numerous, randomly scattered particles of about 8.5 nm in size, whereas the EF (concave) faces had fewer particles. The microvillar membranes had a higher number of particles than did the lateral and basal membranes. Although the number and distribution of particles on the PF faces in the three locations were similar in the two groups of animals, there was a higher number of particles on the EF faces of the membrane from vitamin D-replete chicks than from rachitic chicks. The number of particles were about 0.92 and 2.73 particles/100 nm^2 area in rachitic and vitamin D-replete chicks, resp. In addition, the zonula occludens in rachitic chicks demonstrated a complex arrangement of ridges and grooves, whereas the ridges were fewer in the vitamin D-replete chicks, and many of the ridges showed discontinuities. These changes appear to be related to increased active absorption and passive diffusion of calcium, resp., under the influence of vitamin D_3.

7287 ENHANCEMENT OF IRON ABSORPTION IN IRON DEPLETED RATS BY INCREASING DIETARY FAT. (Eng.) Bowering, J.; Masch, G. A.; Lewis, A. R. (Div. Nutritional Sciences, Cornell Univ., Ithaca, NY 14853). *J. Nutr.* 107(9):1687-1693; 1977.

7288 TRANSPORT OF SODIUM, WATER, 3-O-METHYLGLUCOSE AND L-PHENYLALANINE IN VITRO IN BIOTIN-DEFICIENT RATS [sic] INTESTINE. (Eng.) Petrelli, F.; Coderoni, S.; Moretti, P.; Paparelli, M. (Inst. General Physiology, Univ. Camerino, Camerino, Italy). *Experientia* 33(9):1189-1190; 1977.

7289 IRON ABSORPTION FROM A CEREAL-BASED MEAL CONTAINING CANE SUGAR FORTIFIED WITH ASCORBIC ACID. (Eng.) Derman, D.; Sayers, M.; Lynch, S. R.; Charlton, R. W.; Bothwell, T. H.; Mayet, F. (South African Medical Res. Council Iron and Red Cell Metabolism Unit, Univ. Witwatersrand, Johannesburg, South Africa). *Br. J. Nutr.* 38(2):261-269; 1977.

7290 SUPPRESSION OF TRANSDUODENAL MANGANESE TRANSPORT BY MILK DIET SUPPLEMENTED WITH IRON. (Eng.) Gruden, N. (Inst. Medical Res., M. Pijade 158, 41000 Zagreb, Yugoslavia). *Nutr. Metab.* 21(5):305-309; 1977.

7291 BIGUANIDES AND INTESTINAL ABSORPTIVE FUNCTION. (Eng.) Caspary, W. F. (Dept. Medicine, Univ. Gottingen, D-3400 Gottingen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):473-480; 1977.

7292 THE EFFECT OF EXOGENOUS ATP ON INTESTINA CALCIUM TRANSPORT. (Eng.) Wrobel, J.; Michalska, L. (Medical Sch., ul Debinki 1, 80-211 Gdansk, Poland). *Comp. Biochem. Physiol. [A]* 58(4 421-425; 1977.

7293 MINIREVIEW: INTESTINAL ABSORPTION OF PARTICULATE MATTER. (Eng.) LeFevre, M. E.; Joel, D. D. (Medical Res. Center, Brookhave Natl. Lab., Upton, NY 11973). *Life Sci.* 21(10):1403-1408; 1977.

7294 STUDIES ON DRUG NONEQUIVALENCE: V. GASTROINTESTINAL ABSORPTION OF POLYMORPH OF SULFAMETER. (Eng.) Kuroda, K.; Yokoyama, T.; Umeda, T. (Kobe Univ. Sch. Medicine, Kobe, Japan). *Kobe J. Med. Sci.* 22(4):255-261; 1976.

7295 CALCIUM TRANSPORT BY THE NORMAL RAT COLO IN VIVO AND IN VITRO. (Eng.) Urban, E. Smith, N. L.; Smith, T. C. (Audie L. Murphy Vetera Admin. Hosp., 7400 Merton Minter Blvd., San Antoni TX 78284). *Digestion* 17(1):69-83; 1978.

7296 INTESTINAL RESPONSE TO 1α,25-DIHYDROXYCHOLECALCIFEROL: I. RNA POLYMERASE, ALKALINE PHOSPHATASE, CALCIUM AND PHOSPHORUS UPTAK IN VITRO, AND IN VIVO CALCIUM TRANSPORT AND ACCUMU TION. (Eng.) Morrissey, R. L.; Zolock, D. T.; Bikle, D. D.; Empson, R. N., Jr.; Bucci, T. J. (Letterman Army Inst. Res., Presidio of San Franci co, CA 94129). *Biochim. Biophys. Acta* 538(1):23-33; 1978.

7297 DIGESTION AND ABSORPTION OF PROTEIN. (E Freeman, H. J.; Kim, Y. S. (Veterans Adm Hosp., San Francisco, CA). *Annu. Rev. Med.* 29:99- 1978.

7298 INTESTINAL ABSORPTION OF FATS. (Eng.) Borgstrom, B. (Dept. Physiological Chemistry, Univ. Lund, Lund, Sweden). *Bibl. Nutr. Dieta* 25:1-6; 1977.

See also, 7345, 7444, 7446, 7447, 7472, 7621, 7878

THE EFFECT OF MOTILIN ON THE GASTROINTESTINAL PROPULSION IN RATS.

(Eng.) Naka- , S.; Segawa, K.; Hidano, H.; Tsukamoto, Y.; i, M.; Ichikawa, T. (Nagoya Univ. Sch. Medicine, uma-cho, Showa-ku, Nagoya, 466 Japan). *Gas- nterol. Jpn.* 13(1):50-53; 1978.

ric emptying and intestinal propulsion were rmined simultaneously in unanesthetized rats ^{51}Cr method, and the effect of motilin on rointestinal propulsion was studied. Male ar rats received either physiological saline ml, s.c.) or motilin (10, 100, 400, or 1,000 g, s.c.), followed 15 min later by ^{51}Cr-sodium mate via a stomach catheter. Control rats sacrificed at 15, 30, or 60 min and test rats 0 min after ^{51}Cr-label administration. In the rols, the ^{51}Cr label was shown to move through gastrointestinal tract with time. Intragastric oactivity at 15, 30, and 60 min after dosing 55.2 ± 13.8%, 37.3 ± 4.3%, and 15.0 ± 2.8%, ., which illustrates that gastric emptying is arly dependent upon time (semilogarithmic). Motilin at 10 or 100 ng/kg did not sig- cantly affect gastric emptying, but the intra- ric radioactivity was 24.8 ± 5.1% and 25.5 ± at 400 and 1,000 ng/kg of motilin, resp., n represents a significant ($p<0.02$) accelera- of gastric emptying.

SOME POSSIBILITIES FOR PROSTAGLANDIN MEDIATION IN THE CONTRACTILE RESPONSE TO ATP HE GUINEA-PIG DIGESTIVE TRACT.

(Eng.) Kami- , Y.; Serizawa, K.; Shimo, Y. (Dokkyo Univ. Sch. cine, Mibu-machi, Tochigi 321-02, Japan). *Eur. harmacol.* 45(2):199-203; 1977.

nvestigate the mechanism involved in the con- tile responses of the digestive tract to ATP, influence of the prostaglandin synthesis in- tor, indomethacin, and of the prostaglandin gonist, polyphloretin phosphate (PPP), were ined in various longitudinal muscles of the ea pig digestive tract. ATP (10-300 μM) pro- d contractions in esophageal muscularis mu- e, duodenum, jejunum, and ileum and relaxations he gastric body, tenia cecum, ascending colon, rectum. In addition, "rebound" contractions ared in the gastric body, tenia cecum, as- ing colon, and rectum of all animals immedi- y after ATP had been washed out from the organ . Preincubation with 3-20 μM indomethacin for in significantly inhibited esophageal and small stinal contractions induced by ATP, whereas xation of the stomach, tenia cecum, colon, and um was increased. Rebound contractions of latter preparations were also inhibited. The ctive dose of indomethacin for significant fication differed among preparations (e.g., in esophagus and stomach and 10 or 20 μM in stine). The concentrations of indomethacin in each preparation had no effect on the mus- tone of esophagus and small intestine, but de- sed that of stomach, colon, and rectum by t 15% and that of tenia by about 20% of the mal relaxation caused by an application of roterenol (1 μM). PPP (10-100 μg/ml), preincubated for 15 min, produced similar effects in all preparations. Responses of esophagus and stomach were more effectively modified by PPP than were those of intestine (10 or 30 μg/ml versus 50 or 100 μg/ml, resp.). PPP had no effect on esophageal or small intestinal muscle tone, but in the colon and rectum, the relaxation due to PPP was about 10% and in stomach about 25% of the maximal relaxation caused by an application of isoproterenol. The results suggest that prostaglandin release might contribute to the contractile responses of the guinea pig digestive tract to ATP.

7301 EFFECTS OF SOME DRUGS ON THE CIRCULAR MUSCLE OF THE ISOLATED LOWER OESOPHAGUS.

(Eng.) Takayanagi, I.; Kasuya, Y. (Dept. Chemical Pharmacology, Univ. Tokyo, Tokyo 113, Japan). *J. Pharm. Pharmacol.* 29(9):559-560; 1977.

The effects of various drugs on the circular muscle of the lower esophagus and on the esophageal body isolated from the rat and on the lower esophagus isolated from the guinea pig were investigated. Acetylcholine chloride (Ach), cerulein (CE), tetragastrin (TG), and 5-hydroxytryptamine creatinine sulfate (5-HT) contracted the rat circular muscle of the lower esophagus dose-dependently. The dose response curves for CE, TG, and 5-HT were less steep than that for Ach, and the maximum responses relative to that of Ach were 25 ± 9% for CE, 13 ± 6% for TG, and 38 ± 14% for 5-HT. The response to Ach was abolished by atropine sulfate (10^{-7} g/ml), indicating that the site of action of Ach is a muscarinic receptor. An α-adrenoceptor stimulant, phenylephrine hydrochloride (PE, 10^{-7}-10^{-6} g/ml) relaxed the lower esophageal preparation, and the relaxation by PE was greatly reduced by the α-adrenoceptor blocker, tolazoline hydrochloride (10^{-5} g/ml) or phenoxybenzamine hydrochloride (10^{-7} g/ml) but not by a β-adrenoceptor blocker, propranolol hydrochloride (10^{-7} g/ml). The relaxation by a β-adrenoceptor stimulant, (-)-isoproterenol hydrochloride (3×10^{-8} to 10^{-6} g/ml) was abolished by propranolol (10^{-6} g/ml). PE, however, did contract the lower esophageal preparation, even in the presence of propranolol (10^{-6} g/ml). In the circular muscle of the rat esophageal body, Ach caused a dose-related rise in the basal tension of the preparation. TG and CE had no effect on basal tension. Histamine (HA, 10^{-6}-3×10^{-5} g/ml) and Ach (10^{-6}-3×10^{-4} g/ml) contracted the guinea pig lower esophagus. The response to HA was converted to relaxation in the presence of the HA H_1-receptor antagonist, chlorpheniramine maleate. This relaxation was blocked by cimetidine. The results suggest that the circular and smooth muscle of the lower esophagus has physiological and pharmacological characteristics different from the muscle of the esophageal body, and that there are α- and β-inhibitory adrenoceptors in the circular muscle of the rat lower esophagus as observed in the stomach and intestine.

7302 ANAESTHESIA INDUCTION AND LOWER OESOPHAGEAL SPHINCTER PRESSURE.

(Eng.) Laitinen, S.; Mokka, R. E. M.; Valanne, J. V. I.; Larmi, T. K. I. (Dept. Surgery, Univ. Oulu, Oulu, Finland). *Acta Anaesthesiol. Scand.* 22(1):16-20; 1978.

To investigate the effects of some drugs generally used in premedication for, and induction of, anesthesia on the lower esophageal sphincter (LES) and to investigate the effect of the interaction between atropine (AT) and metoclopramide (MC) on the LES pressure (LESP), a study was carried out in 30 mongrel dogs using the esophageal manometric technique. Three groups of 10 dogs each were treated as follows after thiopental (10 mg/kg, i.v.) anesthesia was induced and basal LESP was measured: group I received AT (0.01 mg/kg) followed 5 min later by MC (0.2 mg/kg), both i.v.; group II received AT and MC in reverse order of group I; and group III received succinylcholine (SC, 0.5 mg/kg, i.v.). In group I, AT reduced LESP from 12.6 ± 3.0 mm Hg to 0.8 ± 0.3 mm Hg ($p<0.01$) with maximum effect by 5 min, and subsequent MC administration did not change the lowered LESP. In group II, MC increased LESP from 11.4 ± 2.7 mm Hg to 24.6 ± 5.4 mm Hg ($p<0.01$), and subsequent AT administration did not change the elevated LESP. In group III, SC had no significant lasting effect on LESP, although a transient rise in LESP and in gastric pressure was noted at the depolarization phase. The results indicate that the routine use of MC in premedication for or induction of anesthesia is indicated to prevent the depressant effect of AT on LESP and the possible consequent gastroesophageal reflux, pulmonary aspiration, and postoperative pulmonary complications.

7303 EFFECT OF HYPOVOLEMIC HYPOTENSION AND HYPOVENTILATION ON LOWER ESOPHAGEAL SPHINCTER PRESSURE (LESP). (Eng.)

LiCalzi, L. K.; Biancani, P.; Behar, J.; Kerstein, M. D. (West Haven Veterans Admin. Hosp., West Haven, CT). *Surg. Forum* 28:344-346; 1977.

The effects of hypoventilation and hypovolemic hypotension of lower esophageal sphincter pressure (LESP) were investigated in a cat shock model. Cats were hypoventilated for 15 min via a tracheostomy by reduction in the respiratory rate and tidal volume to a level determined by a PCO_2 approaching twice the basal level (which had been established within the normal range). After 30 min of return to normoventilation, all animals were bled 30% of estimated blood volume over 1-2 min, and hypotension was maintained for 15 min before reinfusion resuscitation. Bethanecol (20 µg/kg i.v.) was administered basally and 2 min before reversal of hypoventilation or hypovolemia. Hypoventilation produced significant hypercapnia (PCO_2, 59 mm Hg, $p<0.001$), acidosis (pH 7.016, $p<0.001$), hypoxia (PO_2, 57 mm Hg, $p<0.05$), and a 12.9% reduction in LESP ($p<0.05$); return to normoventilation increased LESP by 4.5% (not significant). Hypovolemia produced a significant decrease in LESP (29%, $p<0.05$); resuscitation caused a 43.6% increase in LESP ($p<0.05$) above the basal level. In the basal state, bethanecol produced a prompt 75.6% increase ($p<0.05$) in LESP, which was blocked by hypoventilation and by hypovolemia. Return to normoventilation following bethanecol produced a 97% increase in LES ($p<0.05$), and resuscitation produced a 140% increase in LESP ($p<0.05$). The acute effects of hypoventilation on LESP have direct clinical correlations in the patient with respiratory depression of any cause or with pulmonary insufficiency. The blockade of bethanecol by hypoventilation or shock indicates a disorder at the neuromuscular junction or within the smooth muscle of the lower esophageal sphincter.

7304 BRADYKININ ACTION IN THE RAT DUODENUM THROUGH THE CYCLIC AMP SYSTEM. (Eng.)

Paegelow, I.; Reissmann, S.; Vietinghoff, G.; Ro W.; Arold, H. (Dept. Pharmacology Toxicology, Wil helm-Pieck Univ., Rostock, E. Germany). *Agents Actions* 7(4):447-451; 1977.

The effect of bradykinin (BK) on the rat duodena cyclic AMP (cAMP) system was investigated *in vit* and compared with the effect of BK on the rat ut under the influence of different modulators of B action. Duodena from female rats and uteri from estradiolbencoate (200 µg/kg, 16-20 hr before ex ments)-treated rats were used. BK (6 x 10^{-11}-10 M) induced a dose-dependent relaxation of rat du denum; isoproterenol (3 x 10^{-9}-4 x 10^{-6} M) also produced duodenal relaxation. Propranolol (1.8 3.5 x 10^{-5} M) inhibited only the isoproterenol-induced effect. Pretreatment with ACTH (0.003 i munizing U/ml, 5 min) or NaF (10 mM, 2 min) caused significant ($p<0.01$) increases in BK-indu relaxation; the ACTH potentiation continued for min. Theophylline (5.6 x 10^{-5} M) in the bath al potentiated the BK-induced relaxation. Pretreatment with imidazole (1.5 x 10^{-4} M, 2 min) signif cantly ($p<0.05$) inhibited the effect of BK on th duodenum. BK induced a marked contraction in is lated rat uterus; NaF also produced contraction. This contraction was unaffected by ACTH (dose as above), $NaNO_2$ (10^{-4}-10^{-3} M), theophylline (5.6 x 10^{6} or 5.6 x 10^{-5} M), or imidazole (10^{-3} M). BK did not alter the activity of phosphodiesterase (PDE) from plasma membrane fractio of the rat uterus or rat duodenum or of PDE purified from beef heart. Since activators of adeny ate cyclase activity and inhibitors of cAMP-PDE activity potentiate BK activity whereas a cAMP-P activity stimulator reduces BK activity in the duodenum, BK appears to exert its effect on rat duodenum via the adenylate cyclase system. Such effect is absent in rat uteri.

7305 THE EFFECT OF BRADYKININ ON THE ELECTRICAL ACTIVITY OF RAT JEJUNUM. (Eng.

Hardcastle, J.; Hardcastle, P. T.; Flower, R. J. Sanford, P. A. (Dept. Physiology, Sheffield Univ Sheffield S10 2TN, England). *Experientia* 34(5): 617-618; 1978.

To investigate the possibility that kinins may c tribute to the diarrhea that accompanies certain pathological conditions associated with an elev-

:ed blood kinin level, bradykinin (0.01-6 μg,
.v.) was administered to rats, and the potential
ifference (PD) across the jejunum and colon was
easured. Bradykinin caused a rapid and transient
ncrease in PD across both tissues; the response
as dose-dependent and showed a sigmoid relation-
nip to dose in both tissues. Indomethacin (16
;/kg, s.c.) caused no change in the endogenous PD
the two tissues, but it significantly reduced
ne effect of bradykinin; the maximal jejunal re-
ponse was reduced from 4.1 ± 0.6 to 2.9 ± 0.6
(0.01>p>0.001), and the maximal colonic response
as reduced from 3.9 ± 0.8 to 1.7 ± 0.7 mV (0.05>
>0.01). This reduction suggests that bradykinin
erts its effect by stimulating the production of
ndogenous prostaglandins. The possibility that
radykinin contributes to the diarrhea seen in
arcinoid syndrome by inducing a net secretory
tate in the intestine is discussed.

306 EFFECTS OF HYDROCHLORIDES OF AMINO ACIDS IN TEST MEALS ON GASTRIC EMPTYING. (Eng.)
sher, M.; Hunt, J. N. (Guy's Hosp. Medical Sch.,
ndon, England). *Digestion* 16(1/2):18-22; 1977.

extend knowledge of the action of amino acids
gastric emptying, the effects of hydrochlorides
glycine, alanine, arginine, phenylalanine, and
yptophan were studied in four subjects. The sub-
cts received test solutions containing varying
ounts of the hydrochlorides and phenol red via a
omach tube. The gastric contents were recovered
ter 20 min. The volume of the original meal re-
vered was assessed from the amount of phenol red
pirated. In all subjects, increasing the con-
ntration of amino acid hydrochloride in the given
lution caused an increase in the volume recovered.
yptophan hydrochloride and phenylalanine hydro-
loride were significantly more effective than
re the other three ($p<0.01$ and $p<0.05$, resp.).
e slowing of gastric emptying of amino acid hydro-
lorides is consistent with their action as weak
ids. However, the effect of tryptophan and
enylalanine is slightly greater than is predicted
the basis of their actions as acids.

07 GALLBLADDER MUSCLE RESPONSE TO CHOLECYSTOKININ, GASTRIN, SECRETIN, GLUCAGON AND
RUM CONSTITUENTS: USE AS A BIOASSAY FOR SERUM
OLECYSTOKININ [Abstract]. (Eng.) Rey, J. F.;
ward, J. M.; Harvey, R. F.; Delmont, J. (Bristol
yal Infirmary, Bristol, England). *Digestion*
(1/2):217; 1977.

08 AN AXO-AXONIC SYNAPSE BETWEEN ADRENERGIC AND CHOLINERGIC AXONS IN THE MAMMALIAN
T [Abstract]. (Eng.) Manber, L.; Gershon, M. D.
olumbia Univ., Coll. Physicians and Surgeons,
w York, NY 10032). *Fed. Proc.* 37(3):227; 1978.

7309 INTRINSIC ABILITIES OF THE CAT INTESTINE TO DO PROPULSIVE WORK ON A FLUID LOAD [Abstract]. (Eng.) Weems, W. A.; Seygal, G. E. (Univ. Texas Medical Sch., Houston, TX 77025). *Fed. Proc.* 37(3):228; 1978.

7310 A SPLIT BOWEL TECHNIQUE FOR PHYSICAL DECOUPLING OF INTESTINAL MOTOR SYSTEMS [Abstract]. (Eng.) Tansy, M. F.; Martin, J. S.; Landin, W. E.; Kendall, F. M. (Temple Univ., Philadelphia, PA 19140). *Fed. Proc.* 37(3):373; 1978.

7311 THE RELEASE OF GASTRIN, PP, VIP AND MOTILIN FOLLOWING AN ORAL WATER LOAD AND ATROPINE IN MAN [Abstract]. (Eng.) Modlin, I.; Bloom, S. R.; Christofides, N.; Sarson, D. L.; Albuquerque, R. H.; Ghatei, M. A.; Adrian, T. E. (Hammersmith Hosp., London, England). *Fed. Proc.* 37(3):374; 1978.

7312 MECHANICAL RESPONSES OF CANINE INTESTINAL MUSCLE LAYERS TO ENTEROHORMONES [Abstract]. (Eng.) Martin, J. S.; Tansy, M. F.; Landin, W. E.; Kendall, F. M. (Temple Univ., Philadelphia, PA 19140). *Fed. Proc.* 37(3):373; 1978.

7313 THE EFFECT OF BETHANECHOL OR THE GASTROINTESTINAL HORMONES ON IN VITRO COLONIC MYOELECTRICAL ACTIVITY OF THE CAT [Abstract]. (Eng.) Snape, W. J., Jr.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia, PA 19104). *Fed. Proc.* 37(3):373; 1978.

7314 ROLE OF GASTRIN IN THE REGULATION OF LOWER ESOPHAGEAL SPHINCTER: A CRITICAL REEVALUATION. (Eng.) Binder, H. J. (Yale Univ. Sch. Medicine, 333 Cedar St., New Haven CT 06510). *South. Med. J.* 71(Suppl. 1):48-51; 1978.

7315 REMINISCENCES ON THE ANTIREFLUX MECHANISM. (Eng.) Edwards, D. A. W. (Rayne Inst., University St., London WC1, England). *South. Med. J.* 71(Suppl. 1):2-7; 1978.

7316 LATERAL-HOLE CATHETERS COMPARED WITH SHIELDED-HOLE CATHETER SYSTEMS IN OESOPHAGEAL MANOMETRY. (Eng.) Sundstrom, G.; Ulmsten,

U. (Sundsvalls Sjukhus, Fack, S-581 86 Sundsvall, Sweden). *Scand. J. Clin. Lab. Invest.* 37(7):661-665; 1977.

7317 EFFECT OF ANTI-PARKINSONISM DRUGS ON GASTRIC EMPTYING AND INTESTINAL TRANSIT IN THE RAT. (Eng.) Feldman, S.; Putcha, L. (Coll. Pharmacy, Univ. Houston, Houston, TX 77004). *Pharmacology* 15(6):503-511; 1977.

7318 EFFECTS OF PENTAZOCINE ON THE INTESTINE AND BILIARY TRACT OF THE RABBIT IN VITRO. (Eng.) Tonini, M.; Lecchini, S.; Frigo, G. M.; Crema, A. (Inst. Medical Pharmacology, Univ. Pavia, Piazza Botta 10, I-27100 Pavia, Italy). *Naunyn Schmiedebergs Arch. Pharmacol.* 299(3):207-210; 1977

See also, 7437, 7448, 7467, 7498, 7520, 7720.

SECRETION AND METABOLISM

7319 IN VITRO EFFECTS OF ELEDOISIN ON AMYLASE SECRETION AND CYCLIC AMP CONCENTRATION OF RAT'S PAROTIDS. (Eng.) DeCaro, G.; Cantalamessa, F.; Giacinti, N. (Istituto di Farmacologia e Farmacognosia, Universita di Camerino, Italy). *Farmaco [Sci.]* 32(9):686-688; 1977.

Preliminary experiments on the *in vitro* effects of eledoisin on the cyclic AMP (cAMP) concentration in rat parotid glands are reported. Slices of rat parotid glands were incubated in eledoisin (50, 100, or 1,000 ng/ml) or in buffer alone (control) for 45 min, after which amylase activity in the medium and cAMP concentration in the tissue were determined and expressed as percentages in comparison with controls (arbitrarily set equal to 100%). Eledoisin produced a dose-dependent increase in amylase activity (138.3 ± 8.2, 196.6 ± 19.4, and 202.7 ± 14.8%, resp., for the 3 doses), but its effect on cAMP concentration was erratic, with both increases and reductions. The mean values indicate a fall in cAMP level with increasing eledoisin dose (76.5 ± 15.2, 75.9 ± 22.3, and 62.1 ± 28.7%, resp., for the 3 doses). It does not appear that eledoisin's stimulatory effect on parotid gland amylase secretion is mediated by cAMP.

7320 ACETYLSALICYLIC ACID HYDROLASE: A PREDOMINANTLY GASTROINTESTINAL ENZYME [Abstract]. (Eng.) Nowell, R. M.; Spenney, J. G. (Univ. Alabama in Birmingham, Birmingham, AL). *Fed. Proc.* 37(3):459; 1978.

7321 PANCREATIC AND GASTROINTESTINAL SOMATOSTATIN CELLS IN THE HUMAN FETUS [Abstract]. (Eng.) Paulin, C.; Dubois, M. P.; Assan, R.; Chayvialle, J. A.; Dubois, P. M. (UER Medicale Lyon Sud-Ouest, B.P. 12, 69600 Oullins, France). *Digestion* 16(1/2):216-217; 1977.

7322 IMMUNOFLUORESCENCE-MICROSCOPIC DEMONSTRATION OF MYOSIN AND ACTIN IN SALIVARY GLANDS AND EXOCRINE PANCREAS OF THE RAT. (Eng.) Drenckhahn, D.; Groschel-Stewart, U.; Unsicker, K. (Dept. Anatomy, Univ. Kiel, D-2300 Kiel, W. Germany). *Cell Tissue Res.* 183(2):273-279; 1977.

7323 ELECTRICAL COUPLING AND DYE TRANSFER BETWEEN ACINAR CELLS IN RAT SALIVARY GLANDS. (Eng.) Hammer, M. G.; Sheridan, J. D. (Dept. Genetics, Univ. Minnesota, Minneapolis, MN 55455). *J. Physiol. (Lond.)* 275:495-505; 1978.

7324 BETA-ADRENERGIC RECEPTORS AND ADENYLATE CYCLASE IN HYPERTROPHIC AND HYPERPLASTIC RAT SALIVARY GLANDS. (Eng.) Burke, G. T.; Barka, T. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Biochim. Biophys. Acta* 539(1):54-61; 1978.

See also, 7300, 7336, 7441, 7770.

SECRETION AND METABOLISM

Stomach

7325 THE CYTOPROTECTIVE EFFECT OF MUCOSAL BLOOD FLOW IN EXPERIMENTAL EROSIVE GASTRITIS. (Eng.) Moody, F. G.; McGreevy, J.; Zalewsky, C.; Cheung, L. Y.; Simons, M. (Univ. Utah Coll. Medicine, Salt Lake City, UT). *Acta Physiol. Scand.* (Suppl.):35-43; 1978.

To elucidate the role of mucosal blood flow in the injury that contributes to or follows the breaking of the cation barrier of the gastric secretory epithelium of most mammals, gastric mucosal blood flow (MBF) was studied in anesthetized dogs by aminopyrine clearance or a radioactive microsphere technique. Substances known to enhance ion exchange that disrupt the cation barrier and produce acute erosive gastritis were used: aspirin (20 mM in 0.14 N HCl), alcohol (25% weight/volume), bile salts (20-40 mM sodium taurocholate in 0.14 N HCl), chloromercuribenzene sulfonate (PCMBS, 10 mM in 0.1 M Tris buffer, pH 7.8), and carbenoxolone (0.25% in 1 N saline, pH 7.5). PCMBS caused minimal mucosal injury. The MBF/H^+ back-diffusion ratio was 0.54 ± 0.13 prior to PCMBS and 0.33 ± 0.11 after PCMBS when H^+ loss increased from 1.78 ± 0.63 to 17.8 ± 2.17 μEq/min. When the MBF/H^+ loss ratio was reduced by blood withdrawal (restriction of mucosal perfusion) to 0.07 ± 0.01, massive disruption of the mucosal surface ensued. Carbenoxolone produced a nearly fourfold increase in H^+ to Na^+ exchange and a comparable large increase in mucosal perfusion. The major histological finding was the *in situ* degeneration of mucus cells accompanied by the intracellular solubilization of mucus. Aspirin induced small, multiple, well-circumscribed lesions, but a fourfold increase in mucosal perfusion provided complete protection against injury accompanied by a lesser rate of H^+ back-diffusion. In severe injury, blood flow and H^+ loss were 8.8 ± 0.8 ml/min and -22.3 ± 1.7 μEq/min, resp., whereas in the absence of mucosal injury, these parameters were 36.3 ± 3.4 ml/min and -17.3 ± 2.2 μEq/min, resp. Alcohol injury was mild, with only minimal disturbance in the appearance of the mucosal surface. Bile salts produced a severe injury, with eschar formation over the rugal crest. The results show that in the presence of a rapid rate of H^+ permeation, a decrease in MBF leads to erosive gastritis while an increase in MBF protects gastric mucosa from chemical injury.

7326 MECHANISM OF STRESS ULCER: INFLUENCE OF α-ADRENERGIC BLOCKADE ON STRESS ULCERATION AND GASTRIC MUCOSAL ENERGY METABOLISM. (Eng.) Menguy, R.; Masters, Y. F. (Genesee Hosp., 224 Alexander St., Rochester, NY 14607). *Am. J. Dig. Dis.* 23(6):493-497; 1978.

Experiments were carried out in which splanchnic vasoconstriction during hypovolemia was prevented by α-adrenergic blockade during the state of shock to test the hypothesis that a rapid and profound decrease in mucosal energy metabolism (energy deficit) is responsible for mucosal necrosis during shock-induced gastric mucosal ischemia. Six male albino rabbits subjected to hemorrhagic hypotension for 58-120 min without α-adrenergic blockade all showed severe stress ulceration 60 min after reinfusion, whereas six rabbits subjected to such shock for 120 min with α-adrenergic blockade (phentolamine mesylate, 0.2 g/kg, i.v., followed by 0.02 mg/kg/min until reinfusion) showed no more than minimal gross lesions of stress ulceration (average severity of microscopic mucosal damage on a scale of 0-5 in the fundus, corpus, and antrum were 4.3, 4.2, and 2.5, resp., in the controls and only 1.8, 1.7, and 0.6, resp., in the treated rabbits). In the animals with α-blockade, the indices of mucosal energy metabolism were markedly different from those in animals without blockade. In the former group, the levels of ATP and of ATP + ADP + AMP and the energy charge of the adenylate pool decreased significantly less in all three regions of the gastric mucosa ($p<0.001$-$p<0.05$), and the expected rise of AMP level in the fundus and corpus did not occur in the treated animals. By comparison with unshocked animals, the levels of free glucose, glucose-6-phosphate, fructose-6-phosphate, fructose-1-6-diphosphate, lactate, and pyruvate increased significantly in the fundic and corpus mucosa of all shocked rabbits ($p<0.001$-$p<0.05$), suggesting an increase in the rate of glycolysis. These results support the conclusion that α-adrenergic blockade prevents stress ulceration due to protracted hypotension. The sparing of the mucosa was associated with a significant reduction in mucosal energy deficit, but the association is not sufficient to prove the hypothesis that stress ulceration results from an energy deficit severe enough to cause cell death.

7327 EFFECTS OF CHRONIC PENTAGASTRIN STIMULATION ON PARIETAL CELL SIZE IN RAT GASTRIC MUCOSA. (Eng.) Helander, H. F. (Dept. Anatomy, Univ. Umea, Umea, Sweden). *Acta. Physiol. Scand.* (Suppl.):19-23; 1978.

The effects of chronic pentagastrin stimulation on rat gastric mucosa were studied with quantitative electron microscopical methods to analyze changes that might occur in the size and number of the parietal cells. Eight male Sprague-Dawley rats received pentagastrin injections (250 μg/kg) every 8 hr for 14 days, and eight control rats received no injections. Animals were fasted for 24 hr, with free access to drinking water, before sacrifice. There were no differences between the two groups with respect to ultrastructure of the gastric mucosa; the shape and subcellular morphology of the parietal cells appeared similar in the two groups; the thickness of the mucosa was the same in both groups. The mean profile area of the parietal cells was significantly greater ($p<0.005$) in the stimulated rats (104 ± 9 μm^2) than in the controls (89 ± 7 μm^2). The calculated (estimated) mean volume of the parietal cells was thus 635 ± 76 μm^3 in the control rats and 797 ± 111 μm^3 in the stimulated rats. The volume density of the epithelial cells and of the parietal cells was significantly greater ($p<0.005$) in the stimulated rats (52 ± 4.9% and 16 ± 2.7%, resp.) than in the control rats (44 ± 4.5% and 12 ± 1.5%, resp.). The number of parietal cells per unit volume of mucosa was calculated by dividing the parietal cell volume densities by the mean parietal cell volumes; it was 194,000 ± 24,000/mm^3 in the controls and 198,000 ± 32,000/mm^3 in the stimulated rats. The data show that the trophic effects of chronic pentagastrin stimulation include hypertrophy of the parietal cells.

7328 DIRECT STIMULATORY ACTION OF PENTAGASTRIN ON THE ADENYLATE CYCLASE OF RAT STOMACH MUCOSA.

(Eng.) Nafrady, J.; Wollemann, M. (Univ. Medical Sch., 6701-Szeged, P.O. Box 469, Hungary). *Biochem. Pharmacol.* 26(21):2083-2085; 1977.

The effect of low doses of pentagastrin on adenylate cyclase activity in rat stomach was examined *in vitro*. The basal adenylate cyclase activity of female Wistar rat gastric mucosa particulate cell fractions was significantly enhanced by the addition of either 10^4 M histamine or 33 nM pentagastrin. Doses of pentagastrin as low as 330 pM also caused stimulation. The simultaneous addition of metiamide (10^{-4} M) with histamine (10^{-4} M) completely inhibited histamine-induced adenylate cyclase stimulation, but the administration of 10^{-4} M metiamide with 33 nM pentagastrin had no effect. Because an H_2 receptor antagonist fails to inhibit pentagastrin-stimulated adenylate cyclase activity, pentagastrin receptors must be directly connected with adenylate cyclase in the rat stomach mucosa.

7329 SYMPATHETIC NEUROENDOCRINE REGULATION OF GASTRIC INHIBITORY POLYPEPTIDE RESPONSE TO GLUCOSE.

(Eng.) Sirinek, K. R.; Cataland, S.; O'Dorisio, T.; Mazzaferri, E. L.; Crockett, S.; Pace, W. G. (Ohio State Univ. Coll. Medicine, Columbus, OH). *Surg. Forum* 28:377-379; 1977.

The effect of exogenous sympathomimetic and sympatholytic drugs on both basal and glucose-stimulated gastric inhibitory polypeptide (GIP) release was studied in dogs. The i.v. infusion of isoproterenol (5 μg/kg/hr), propranolol (5 μg/kg/hr), epinephrine (5 μg/kg/hr), norepinephrine (0.5 μg/kg/hr), or dibenzylene (0.5 mg/kg/hr) had no effect on fasting GIP concentrations. Compared with fasting concentrations, incremental GIP was significantly ($p<0.05$) increased at 15, 30, and 45 min for all treatment groups. Compared with intraduodenal glucose alone, the GIP response following intraduodenal glucose (50 ml, 20% glucose) plus i.v. dibenzylene was significantly ($p<0.05$) greater at 15 and 30 min. Compared with glucose alone, the GIP response following glucose and propranolol was significantly ($p<0.05$) less at 15 and 30 min. This study demonstrates both augmentation and blunting of glucose-stimulated GIP release by sympatholytic drugs, suggesting a physiologic role for the sympathetic neuroendocrine system in modulating the GIP response to glucose.

7330 A FAT-ENRICHED MEAL AUGMENTS GASTRIC INHIBITORY POLYPEPTIDE AND SUPPRESSES GASTRIN CONCENTRATIONS.

(Eng.) Tetirick, C. E., Jr.; O'Dorisio, T.; Sirinek, K. R.; Cataland, S.; Pace, W. G. (Ohio State Univ. Coll. Medicine, Columbus, OH). *Surg. Forum* 28:379-380; 1977.

Because it has been previously shown that exogenou gastric inhibitory polypeptide (GIP) suppresses the serum gastrin response to a meal, studies wer carried out to determine whether GIP may physiologically modify gastrin release. GIP release wa stimulated in experimental dogs by feeding a meal containing 67 g of fat (fat-enriched meal). Cont received a meal containing 20 g of fat. The mean change in serum GIP concentration at 75, 90, 105, and 120 min was significantly greater ($p<0.05$) wi the fat-enriched meal than with the control meal. Conversely, the mean serum change in gastrin response was markedly reduced at 75, 90, 105, and 120 min in the fat-enriched meal as compared with the control meal. These results demonstrate that the enrichment of a meal with fat enhances GIP re lease, and that this release is temporally associated with a diminution in serum gastrin respons during the second postcibal hour. This response suggests that endogenous GIP release may physiologically modify meal-stimulated gastrin respons

7331 INTRAVENOUS INFUSION OF AMINO ACIDS STI ULATES GASTRIC ACID SECRETION IN MAN.

(Eng.) Isenberg, J. I.; Maxwell, V. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *N. Engl. J. Med.* 298(1):27-29; 1978.

To determine whether the acid secretory effect of intestinal protein perfusion is in part due to the absorption of amino acids and small peptides from the gut, the effect of i.v. amino acid infusion on gastric acid secretion was studied in six men. The i.v. infusion of 10.6, 21.2, or 42. g of a mixture of L-amino acids significantly ($p<0.05$) stimulated gastric acid secretion. The response to 21.2 and 42.5 g of i.v. amino acids (29.8 ± 7.6 mEq/4 hr at 42.5 g) was similar to th of 42.5 g of intraduodenal amino acids (36.3 ± 6. mEq/4 hr), and was significantly greater ($p<0.05$) than the response to a control i.v. infusion of sodium chloride alone (7.1 ± 3.3 mEq/4 hr). The addition of 250 g of glucose to the i.v. infusio did not significantly alter secretory responses. The serum gastrin level did not significantly change during the i.v. amino acid infusions. The maximal acid secretory response to 21.2 and 42.5 g of i.v. amino acids was approximately one-thir of the response to either intragastric amino aci or the maximal response to pentagastrin. The observation that the secretory response to i.v. amino acids is similar to that produced by small intestinal amino acids suggests that the intestinal phase of gastric acid secretion in man may be mediated totally or in part by the absorption of amino acids from the gut.

7332 STUDIES ON THE ROLE OF SEROTONIN IN GASTRIC PEPSIN SECRETION.

(Eng.) Wanza, M. F.; Stein, T.; Wise, L. (Long Island Jewish-Hillside Medical Center, New Hyde Park, NY). *Surg. Gynecol. Obstet.* 146(6):929-932; 1978.

To evaluate further the role of serotonin in pepsin secretion, studies were carried out in eight female mongrel dogs each provided with a Heidenhain pouch and with a gastric cannula to divert the acid secreted by the remaining stomach away from the duodenum. Histamine was infused (0.04 mg/kg/hr) for the entire 4-hr study period; when given alone it constituted the control. When reserpine (0.1 mg/kg, i.m.) was given 24 hr before histamine infusion to deplete the serotonin level, the initial histamine-induced peaks in pepsin concentration (47 ± 20 x 10^3 PU$^{\mathrm{Hb}}$ [hemoglobin substrate]/ml) and output (169 ± 41 x 10^3 PU$^{\mathrm{Hb}}$/ml) were abolished ($p<0.05$). Serotonin replacement by 5-hydroxytryptophan significantly increased ($p<0.05$) both the pepsin concentration (38 ± 12 x 10^3 PU$^{\mathrm{Hb}}$/ml) and output (318 ± 117 x 10^3 PU$^{\mathrm{Hb}}$/ml). The administration of the serotonin antagonist 1-methyl-d-lysergic acid butanol-amide significantly reduced the histamine-induced peaks of pepsin concentration (from 42 ± 7 x 10^3 to 5 ± 3 x 10^3 PU$^{\mathrm{Hb}}$/ml, $p<0.05$) and output (from 213 ± 47 x 10^3 to 20 ± 8 x 10^3 PU$^{\mathrm{Hb}}$/ml, $p<0.01$). These data suggest that serotonin is a stimulator of histamine-stimulated pepsin secretion in denervated gastric pouches in dogs.

7333 UNCOVERING RHYTHMS IN SERUM GASTRIN.

(Eng.) Saik, R. P.; Weisenfeld, N.; Greenburg, A. G.; Kripke, D.; Peskin, G. (Veterans Admin. Hosp., 112E, 3350 La Jolla Village Drive, San Diego, CA 92161). *J. Surg. Res.* 24(5):380-383; 1978.

Because rhythms in acid output have been documented in man without corresponding rhythms in serum gastrin, a study was undertaken in dogs to uncover such rhythms, unencumbered by the influence of feeding, and to assess the importance of diverting acid from the antrum. Peripheral serum gastrin levels were sampled basally and every 2 hr for 24-hr periods in three groups of mongrel dogs fasted with access to water on the day prior to each study (2 studies/dog). In group I (4 normal dogs), a consistent circadian rhythm was evidenced by the nonrandom ($p<0.05$) phase angle distribution of the occurrence of peak gastrins, the circadian amplitude being 100%. In group II (3 dogs in which an innervated antral pouch was exteriorized to eliminate the effects of acidity), the phase angle distribution was random. In group III (5 dogs with innervated antral pouches explanted onto the transverse colon to achieve a hypergastrinemic state), serum gastrin levels were consistently more than double the preoperative levels, but the phase angle distribution was again random. It is concluded that a circadian rhythm of gastrin exists in the dog and is abolished by removing acid or by continuous maximal stimulation, suggesting that the rhythm is dependent on intraluminal pH and independent of vagal activity per se except as this activity may affect acid output. Physiological distention may also play a role in the circadian release of gastrin.

7334 THE ACTION OF INTRAVENOUS ETHANOL ON GASTRIC SECRETION.

(Eng.) Kondo, T.; Magee, D. F. (Nagoya Univ., Nagoya, Japan). *Proc. Soc. Exp. Biol. Med.* 156(2):299-302; 1977.

Experiments were carried out in dogs to test the hypothesis that gastrin is the mediator through which ethanol stimulates gastric secretion. Four dogs with Heidenhain pouches and five with gastric fistulae and innervated antral pouches were used after 18-hr fasts in experiments involving ganglionic and cervical vagal blocks and in experiments with antral pouch acidification, resp. Ganglionic block was induced with pertolinium tartrate (usually 1 mg/kg, s.c.) at the start of ethanol infusion (4 ml/min, i.v. of 10% ethanol) with atropine (1 mg, i.m.) superimposed after 60 min. Cervical vagi were blocked by infiltration anesthesia using 2% Xylocaine to both nerves 30 min after beginning the ethanol infusion. Antral acidification was accomplished by intubation with 0.1 N HCl (10 ml/min), and ethanol infusion was begun when the resting secretion from the stomach was nearly zero. The i.v. infusion of ethanol (control) stimulated fistula acid and pepsin secretion and Heidenhain pouch acid but not pepsin secretion. Ganglionic blockade eliminated ethanol-stimulated fistula acid and pepsin secretion and diminished the pouch acid and pepsin secretion; the addition of atropine reduced pouch and fistula acid secretion to basal levels ($p<0.05$). Cervical vagal block did not suppress either fistula or pouch acid or pepsin secretion. After antral acidification to pH 1, ethanol no longer stimulated fistula acid or pepsin secretion, but a return to pH 7 caused steep increases in both secretions. It is concluded that i.v. ethanol administration stimulates gastric secretion mainly by liberating antral gastrin.

7335 EFFECTS OF ORAL CALCIUM AND MAGNESIUM ADMINISTRATION ON GASTRIC ACID SECRETION AND SERUM GASTRIN CONCENTRATION IN MAN.

(Eng.) Mazzacca, G.; Budillon, G.; D'Agostino, L.; D'Agostino, E.; Buonocore, S. (II Clinica Medica dell'Universita di Napoli, Napoli, Italy). *Rend. Gastroenterol.* 9(2):105-108; 1977.

To examine whether the simultaneous ingestion of calcium and magnesium compounds can abolish the gastric stimulation observed after p.o. calcium ingestion alone, studies were carried out in seven healthy volunteers that had fasted overnight. Test solutions were given by intubation, and gastric secretion and blood were sampled for 2 hr. After 2 g calcium carbonate, gastric acid output increased during the 1st hr in all subjects; after magnesium hydroxide (8.0 ml milk of magnesia), gastric acid output was unchanged in five and decreased slightly in two; and after a combination of the two antacids, gastric acid output was unchanged in four and slightly increased in three. The mean acid secretory response to calcium carbonate was significantly increased above the basal level in both the 1st ($p<0.001$) and 2nd ($p<0.01$) hr, but it was unchanged by magnesium hydroxide or by both antacids together. Ingestion of calcium carbonate alone or calcium carbonate plus magnesium hydroxide produced a significant rise ($p<0.01$) in serum gastrin concentration above the basal level at both 30 and 60 min, but there was no change after magnesium hydroxide ingestion. Because magnesium ingestion antagonizes the effect of p.o. calcium on gastric acid secretion, the use of antacid preparations containing both magnesium and calcium appears warranted in short-term therapy.

7336 SOMATOSTATIN INHIBITS AND REVERSES HYPERGASTRINEMIA INDUCED BY PARATHYROID HORMONE, CALCIUM, AND ACETYLCHOLINE. (Eng.) Bolman, R. M., III; Cooper, C. W.; Garner, S. C.; Wells, S. A., Jr. (Duke Univ. Medical Center, Durham, NC). *Surg. Forum* 28:373-374; 1977.

The effects of somatostatin (somatotropin release-inhibiting factor, SRIF) on gastrin release induced by parathyroid hormone (PTH), calcium, or acetylcholine (ACH) were studied in anesthetized pigs. Test substances were infused directly into the antral circulation via a catheter in the right gastroepiploic artery. Synthetic SRIF (1.67-16.7 µg/min), infused together with PTH (bovine 1-84 or synthetic human 1-34, 0.04-0.4 U/min), prevented the 20- to 30-fold rise in gastrin observed following the infusion of equal doses of PTH alone ($p<0.001$). Infusion of SRIF (1.67 µg/min) together with 0.05 M $CaCl_2$ in five pigs markedly inhibited the large increase in gastrin release produced by $CaCl_2$ alone ($p<0.05$ to $p<0.001$). Infusion of SRIF (3.34-16.7 µg/min) together with 0.1 M ACH largely inhibited the 10- to 20-fold rise in gastrin observed following infusion of ACH alone in four of six pigs ($p<0.05$ to $p<0.005$ in 3 of 4 pigs). Infusion of SRIF (1.67-16.7 µg/min) after stimulation of gastrin secretion by PTH, $CaCl_2$, or ACH produced a rapid and pronounced decrease in gastrin secretion (after PTH, -75%, $p<0.005$ in 3 pigs; after Ca, -79%, $p<0.025$ in 3 of 4 pigs; after ACH, -86%, $p<0.05$ to $p<0.001$ in 5 pigs). It is concluded that SRIF inhibits gastrin release induced by PTH, Ca, or ACH and also reverses a hypergastrinemia evoked by any of these secretagogues. SRIF is thus a useful tool for studying mechanisms involved in gastrin release.

7337 GASTRIN STIMULATED H^+ SECRETION IN AMPHIBIAN GASTRIC MUCOSA: EFFECT OF TETRODOTOXIN. (Eng.) Spenney, J. G. (Veterans Admin. Hosp., Birmingham, AL 35294). *Experientia* 34(5): 625-626; 1978.

The role of neural mechanisms in gastrin-stimulated H^+ secretion was studied in amphibian gastric fundic mucosa using tetrodotoxin, a compound that blocks neural Na^+ channels. Adult bullfrog mucosa was mounted in an *in vitro* preparation. The initial H^+ secretion rate was measured, and then burimamide (10^{-4}-10^{-3} M) was added to the serosal solution; H^+ secretion was totally inhibited. Tetrodotoxin (3.0×10^{-6} M) and then pentagastrin (3.3×10^{-6} M) were added to the serosal solution. Burimamide produced a rise in transmucosal potential difference (PD) and resistance (R) coincident with H^+ secretion inhibition. Tetrodotoxin added to either the spontaneously-secreting or resting mucosa had no effect on H^+ secretion and no consistent or significant effect on PD or R. Pentagastrin added in the presence of tetrodotoxin was an effective stimulant of gastric H^+ secretion (the average rise was to 5.22 µmol/cm^2/hr from 0); the PD and R decreased. The failure of tetrodotoxin to block gastrin stimulation of H^+ secretion indicates that neural mechanisms are not required.

7338 EFFECT OF VAGAL STIMULATION ON THE CONCENTRATION OF GASTRIN IN SERUM AND ANTRAL MUCOSA IN DOGS. (Eng.) Watayou, T.; Ramus, I.; Thompson, J. C. (Univ. Texas Medical Branch, Galveston, TX 77550). *Arch. Surg.* 113(1):87-89; 1978.

The rapidity and duration of gastrin release at the antrum after electrical stimulation of the vagus nerve were assessed in dogs, and the changes in gastrin concentration in antral mucosa that result from this vagal stimulation were measured. Electrical vagal stimulation produced a significant increase in the circulating serum gastrin concentration at 1 min to 1 hr after the initiation of the stimulus ($p<0.05$). After 1 hr of continued stimulation, the antral gastrin concentration also increased significantly ($p<0.02$). The results suggest that vagal release of gastrin triggers its rapid synthesis.

7339 GASTRIN: OBLIGATORY INTERMEDIATE IN THE POSTPRANDIAL MOBILIZATION OF GASTRIC HISTAMINE IN THE RAT. (Eng.) Hakanson, R.; Hedenbro, J.; Liedberg, G.; El Munshid, H. A.; Rehfeld, J. F. (Dept. Pharmacology, Univ. Lund, Lund, Sweden). *Experientia* 33(11):1541-1543; 1977.

The effects of antral gastrin and of vagal excitation on postprandial histamine release in the rat were investigated. Adult male Sprague-Dawley or Wistar rats underwent radical antrectomy (pyloric gland area, the adjacent portion of the oxyntic gland area, and the duodenal bulb) with great care to eliminate the entire lesser curvature. The nervous and vascular supply to the remainder of the stomach was spared. After recovery, all rats were fasted 48 hr; group 1 remained fasted (control), group 2 received food for 1 hr, and group 3 received pentagastrin s.c. After sacrifice at dif-

ent times over a 5-hr period, serum gastrin was
ermined radioimmunochemically, the oxyntic mu-
al histamine level was determined fluorometri-
ly, and oxyntic histidine decarboxylase activity
determined radiometrically. In unoperated
ted rats, feeding raised the serum gastrin con-
tration ($p<0.001$), reduced the mucosal histamine
centration ($p<0.001-0.01$), and activated histi-
e decarboxylase activity ($p<0.001$) to signifi-
t degrees; feeding failed to elicit any of these
ects in antrectomized rats. In unoperated fasted
s, pentagastrin reduced the histamine concentra-
n over the first 2 hr ($p<0.001-0.01$) and acti-
ed the histidine decarboxylase activity ($p<0.001$).
operated, fasted rats, the basal histamine level
lower than in control rats, but they still re-
nded to pentagastrin administration with re-
tion of the histamine level (significant at 1
$p<0.001$) and activation of histidine decarboxy-
e activity ($p<0.001-0.01$). It is concluded that
ral gastrin is an obligatory mediator of the
tprandial activation of histidine decarboxylase
mobilization of histamine.

n-METHYL, 5-METHYL HISTAMINE EVOKES A
HIGHER MAXIMAL RATE OF GASTRIC ACID SE-
TION THAN HISTAMINE. (Eng.) Impicciatore, M.;
taccini, G.; Mossini, F.; Hansen, D.; Grossman,
I. (Veterans Admin. Wadsworth Hosp. Center, Los
eles, CA 90073). *Proc. Soc. Exp. Biol. Med.*
(2):296-298; 1977.

effects of the histamine H2 receptor antagonist
ethyl, 5-methyl histamine (dimethylhistamine,
on acid secretion in gastric fistula cats
investigated. When graded doses of DMH (10-
20 µg/kg/hr) or histamine (10-640 µg/kg/hr) were
en i.v. at 30-min intervals, the maximal re-
nse to DMH was significantly greater than that
histamine ($p<0.02$). When graded doses of hista-
e (80-2,560 µg/kg/hr) were given i.v. at 30-min
ervals with and without a constant background
the histamine H1 receptor antagonist pyrilamine
mg/kg loading dose plus 2 mg/kg/hr), the max-
l response to histamine plus pyrilamine was
nificantly greater than that to histamine alone
.02). When graded doses of DMH (320-5,120 µg/
hr) were given i.v. at 30-min intervals with
without a constant background of histamine
uble the dose needed for maximal response), the
imal response to DMH was significantly lower
the presence of histamine ($p<0.02$) than in its
ence. The maximal response to the combined
gs was similar to the maximal response to his-
ine alone. These findings are compatible with
hypothesis that, in addition to the well known
ion of histamine on H2 receptors, it also acts
H1 receptors to inhibit gastric acid secretion.

EFFECT OF CIMETIDINE ON ION FLUXES AND
POTENTIAL DIFFERENCE ACROSS THE HUMAN
MACH. (Eng.) Ivey, K. J.; Mackercher, P. A.
t. Medicine, Univ. Missouri, Columbia, MO 65201).
19(5):414-418; 1978.

letermine whether the reduction of acid output by cimetidine in man is due entirely to a reduction in acid secretion or whether increased back diffusion of hydrogen ions is also occurring, fluxes of H^+, Na^+, K^+, and Cl^- ions after acid instillation into the stomach were studied in six healthy subjects with and without prior p.o. administration of 300 mg cimetidine. Potential difference across gastric mucosa was measured continuously throughout each study. Cimetidine caused a significant reduction in hydrogen ion secretion (5.05 mEq/15 min in controls versus 2.70 mEq/15 min with cimetidine, $p<0.05$), and consequently a significant reduction in net hydrogen flux into the gastric lumen (2.01 mEq/15 min versus 0.02 mEq/15 min, resp., $p<0.05$). There were no significant differences between sodium ion fluxes in control and cimetidine studies, suggesting that the gastric mucosal barrier remained intact. Cimetidine alone caused a highly significant rise in intragastric pH (to 7) and of potential difference ($p<0.001$). Addition of intragastric acid (pH <1.0) did not reverse the rise in potential difference caused by cimetidine, suggesting that factors other than change in intragastric pH were involved. These studies support the concept that reduction in acid output by cimetidine is due to inhibition of acid secretion, and not to increased permeability to hydrogen ion.

7342 CIMETIDINE AND PROSTAGLANDIN: EVIDENCE FOR DIFFERENT MODES OF ACTION ON THE RAT GASTRIC MUCOSA. (Eng.) Carmichael, H. A.; Nelson, L. M.; Russell, R. I. (Royal Infirmary, Glasgow G4 OSF, Scotland). *Gastroenterology* 74(6):1229-1232; 1978.

Studies were carried out in rats to determine whether cimetidine, like prostaglandin E_2 methyl ester ($Me\text{-}PGE_2$), inhibits aspirin-induced gastric mucosal erosions. The effects of cimetidine and $MePGE_2$ on aspirin-induced gastric mucosal erosions in the continual presence of HCl were also measured. Cimetidine (50 mg/kg) significantly inhibited ($p<0.01$) gastric mucosal erosions induced by aspirin (192 mg/kg), reducing the incidence from 70% of 20 rats to 9.5% of 21 rats; the mean lesion score was reduced from 9.3 ± 2.1 to 0.4 ± 0.3. The effect of the above doses of $Me\text{-}PGE_2$ and cimetidine on gastric erosions induced by aspirin (192 mg/kg) were compared with the hourly addition of 160 mM HCl. The incidence of erosions in the aspirin plus HCl group was 100% of 20 rats (mean lesion score 27.4 ± 2.4). This incidence was not significantly reduced by cimetidine, the incidence being 90% of 20 rats (mean lesion score 19.7 ± 3.4). The incidence of erosions in the presence of $Me\text{-}PGE_2$ was significantly less than that in both the other groups (13% of 23 rats; mean lesion score 3.1 ± 0.8, $p<0.01$ in both instances). These results suggest that, whereas cimetidine protects the gastric mucosa through acid inhibition, $Me\text{-}PGE_2$ appears to have a protective effect independent of acid inhibition.

7343 EFFECTS OF BLOOD GLUCOSE LEVELS ON ASPIRIN-INDUCED GASTRIC MUCOSAL DAMAGE. (Eng.) MacDonald, A.; Dekanski, J. B.; Gottfried, S.; Parke, D. V.; Sacra, P. (Biorex Lab. Ltd., Canonbury Villas, London N1 2HB, England). *Am. J. Dig. Dis.* 22(10):909-914; 1977.

To investigate the effects of fasting and other procedures that affect blood glucose levels on the susceptibility of rats to aspirin-induced (200 mg/kg, p.o.) gastric mucosal damage, female Biorex Wistar rats were studied under various conditions. In rats fasted for 18 hr, blood glucose levels decreased ($p<0.001$), the incidence (100% versus 45% in controls) and severity ($p<0.002$) of mucosal damage increased, and gastric glycoprotein synthesis decreased by 50% ($p<0.05$) compared with controls; glucose (50 mg/ml) in the drinking water prevented these changes. Fed rats with alloxan-induced (100 mg/kg, s.c., for 5 days) diabetes were similar to controls in terms of aspirin-induced mucosal damage and glycoprotein synthesis, but 18-hr fasted diabetic rats had greater incidence (100% versus 50% in controls) and severity ($p<0.05$) of aspirin-induced mucosal damage and greatly decreased glycoprotein synthesis (to 33% of control value, $p<0.01$). In nondiabetic rats, insulin (10 U/kg, s.c.) followed by the removal of food caused a significant fall in blood glucose level ($p<0.001$), an increase in the incidence (100% versus 50% in controls) and severity ($p<0.02$) of aspirin-induced mucosal lesions, and a significant decrease in glycoprotein synthesis (to 19% of control, $p<0.05$) Insulin treatment of alloxan-induced diabetic rats did not change their susceptibility to aspirin-induced mucosal damage (60%) or its severity or the extent of glycoprotein synthesis when compared with untreated diabetic rats. *In vitro* incubation of mucosal homogenates with 10^{-4} M dibutyryl cyclic AMP or 10^{-4} M theophylline decreased glycoprotein synthesis significantly ($p<0.05$) to 60% and 62%, resp., of control, but incubation with dibutyryl cyclic GMP (10^{-4} M) had no significant effect. The results indicate that hypoglycemia may be a factor in the susceptibility of rats to aspirin-induced gastric mucosal damage and that cyclic AMP may be involved in the synthesis and secretion of mucus from gastric mucosal cells.

7344 EFFECTS OF HISTAMINE, PENTAGASTRIN AND ACETYLCHOLINE ON CANINE GASTRIC SECRETION IN VITRO [Abstract]. (Eng.) Kuo, Y. J.; Shanbour, L. L. (Univ. Texas Medical Sch., Houston, TX 77030). *Fed. Proc.* 37(3):697; 1978.

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7346 MUCOSAL LESIONS DUE TO GASTRIC DISTENSION IN THE RAT. (Eng.) Gati, T.; Guth, P. H. (Semmelweis Medical Sch., Budapest, Hungary). *Am. J. Dig. Dis.* 22(12):1083-1090; 1977.

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7348 CHARACTERIZATION AND DEVELOPMENT OF CIMETIDINE AS A HISTAMINE H_2-RECEPTOR ANTAGONIST. (Eng.) Brimblecombe, R. W.; Dunca
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7350 EFFECTS OF THE H_2-ANTAGONISTS ON HIST
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ISOLATED PARIETAL CELLS. (Eng.) Soll, A. H. (Veterans Admin. Center, Building 115, Room 115
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7355 INFLUENCE OF SALICYLATES ON THE RATE
ACCUMULATION OF DEOXYRIBONUCLEIC ACID
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MORPHOLOGICAL DATA FOR THE GASTRIC
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GUINEA PIG STOMACH: RESPONSE TO SECRETA-
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Natl. Inst. Health, Bethesda, MD 20014). *Gastro-*
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59 THE INTESTINAL PHASE OF GASTRIC ACID SECRE-
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2 GASTRIC MUCOSAL DAMAGE CAUSED BY PLAIN AND
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7367 EFFECT OF PHENOLIC ACIDS AND RELATED COMPOUNDS ON GASTRIC ACID SECRETION IN THE RAT. (Eng.) Tani, S. (Faculty Pharmaceutical Sciences, Josai Univ., 1-1, Keyakidai, Sakado-shi, Saitama-ken, 350-02, Japan). *Chem. Pharm. Bull.* 26(1):309-311; 1978.

7368 PREVENTION OF ACUTE GASTRIC ULCERATION IN THE RAT BY CIMETIDINE, A HISTAMINE H_2-RECEPTOR ANTAGONIST. (Eng.) Lee, S. P.; Tasman-Jones, C. (Sch. Medicine, Univ. Auckland, Park Rd., Auckland, New Zealand). *Clin. Exp. Pharmacol. Physiol.* 5(1):61-66; 1978.

7369 GASTRIC VOLUME AND pH IN OUT-PATIENTS. (Eng.) Ong, B. Y.; Palahniuk, R. J.; Cumming, M. (Univ. Manitoba, Health Sciences Center, 700 William Ave., Winnipeg, Manitoba R3E 0Z3, Canada). *Can. Anaesth. Soc. J.* 25(1):36-39; 1978.

7370 EFFECT OF CYCLO-ALKYL LACTAMIMIDES UPON HUMAN PEPSINS AND PEPSINOGENS. (Eng.) Roberts, N. B.; Taylor, W. H. (Dept. Chemical Pathology, Ashton St., Liverpool L3 5RT, England). *Clin. Sci. Mol. Med.* 54(2):181-185; 1978.

See also, 7278, 7311, 7313, 7320, 7321, 7527, 7537, 7589, 7590, 7607, 7609, 7621.

SECRETION AND METABOLISM

Pancreas

7371 BIOCHEMICAL STUDIES OF PANCREATIC JUICE COLLECTED BY DUODENAL ASPIRATION AND ENDOSCOPIC CANNULATION OF THE MAIN PANCREATIC DUCT.

(Eng.) Escourrou, J.; Frexinos, J.; Ribet, A. (Clinique des Maladies de l'Appareil Digestif, C.H.U. de Rangueil, 31054 Toulouse Cedex, France). *Am. J. Dig. Dis.* 23(2):173-177; 1978.

The collection of pancreatic secretion by a classical duodenal aspiration technique was compared with collection by cannulation of Wirsung's duct under duodenoscopic control in the same seven fasted, healthy subjects. In both cases, the same stimulants were used: 0.5 clinical U/kg/hr of GIH secretin and 75 ng/kg/hr of cerulein, given in a saline chloride infusion over 1 hr. The pH determined to the nearest 1/100 unit was found to be significantly higher ($p<0.05$) in samples collected by cannulation than in samples collected by aspiration. The mean of volumes for every subject showed no significant difference between pure pancreatic juice (PPJ, 104 ± 20.07 ml/30 min) and duodenal aspirate (DA, 103.8 ± 37.53 ml/30 min). However, the variance was greater in the DA ($S2=1,645.5$) than in the PPJ ($S2=441.8$). The bicarbonate concentration in the PPJ (124.51 ± 11.32 mEq/l) was significantly greater than that in the DA (76.14 ± 9.30 mEq/l, $p<0.001$), as was the bicarbonate output (429.4 ± 80.37 versus 260 ± 94.5 μEq/min). There was a linear relation between the weight of the subject and the bicarbonate output measured in the PPJ ($r=0.81$). There was no statistical separation between the mean concentrations and outputs of protein, lipase, chymotrypsin, and amylase determined in the DA and in the PPJ. The results show that, in the normal subject, the collection of pancreatic juice obtained by endoscopic cannulation of the main pancreatic duct is necessary to explore the maximal secretory capacity of water and electrolytes. However, this technique is no better than the present method of duodenal aspiration with stimulation by secretin or cerulein for the exploration of the enzyme secretion.

7372 THE POLAR INTERACTIONS BETWEEN PANCREATIC LIPASE, COLIPASE AND THE TRIGLYCERIDE SUBSTRATE.

(Eng.) Borgstrom, B.; Donner, J. (Dept. Physiological Chemistry, Univ. Lund, POB 750, S-220 07 Lund, Sweden). *FEBS Lett.* 83(1): 23-26; 1977.

The type of bonding interaction that occurs between pancreatic lipase and colipase on one hand and the bile salt-laden substrate interface on the other was investigated using porcine and rat pancreatic juice, various triglyceride substrates, and a 2-mM Tris-maleate buffer (pH=7.0) in 1 mM $CaCl_2$ with varying concentrations of NaCl and bile salt. In some cases, the pH of the buffer was varied. In the absence of bile salts, lipase adsorbed completely to the tributyrin (substrate) interface and NaCl (up to 1 M) did not affect the binding. In the presence of bile salt above the critical micellar concentration (4 mM taurocholate), the binding of lipase to tributyrin depended on the salt concentration, the pH of the solution, and the pI of the enzyme. At low salt concentration, rat lipase bound substrate up to pH 7.5 and above M NaCl, no binding occurred at any pH. The bindin curve over pH shifts to the left as the salt concentration rises, as does the pH optimum for the enzyme. In the absence of NaCl, both lipases bound to three different oil/water interfaces (tributyrin, trioctyl glyceryl ether, hexadecane) to the same extent. Addition of NaCl drove the lipase into the aqueous phase; the NaCl concentration required to accomplish this shift depended on the interface structure, being lowest for hexadecane, higher for the ether, and highest (>0.1 M) for the ester. The adsorption of colipase to tributyrin was unaffected by NaCl (0-1 M) in the absence of bile salt; above 4 mM taurocholate, increasing the NaCl concentration decreased the adsorption with no adsorption occurring at 1 M. When trioctyl glyceryl ether was used in the presence of >4 mM taurocholate at pH 7.0 and 150 mM NaCl, no colipase adsorption occurred. The results demonstrate that polar rather than hydrophobic bonding is important for the attachment of lipase and colipase to their bile salt-laden substrates at the substrate oil/water interface. It is suggested that the specific bonding of these two proteins to their substrates occurs via hydrogen bonds to substrate carbonyl groups.

7373 A STUDY OF THE SYNTHESIS OF DNA, RNA, PROTEIN, AND OXYGEN UPTAKE IN SEGMENTS OF THE RAT PANCREAS.

(Eng.) Adams, H. W.; Webste P. D., III (Medical Coll. Georgia, Augusta, GA). *Am. J. Dig. Dis.* 22(10):898-901; 1977.

To determine whether there is metabolic uniformity among segments of the pancreas, the synthesis of DNA, RNA, and protein and oxygen uptake were studied *in vitro* in the head (parabiliary and duodenal segments), body (gastric segment) and tail (splenic segment) of the pancreas of male Sprague-Dawley rats. There was no significant difference in the DNA content (except that the tail segment averaged 10% less DNA/mg wet tissue than did the body or head, $p<0.05$), RNA content expressed in terms of DNA, or protein content expressed in terms of DNA among the three segments. The rates of DNA synthesis (incorporation of ^3H-thymidine), RNA synthesis (incorporation of ^3H-uridine), and protein synthesis (incorporation of ^{14}C-phenylalanine) were not significantly different among the three segments, nor was the oxygen

ptake (consumption) in the three segments sig-
ificantly different. The lower DNA content in
he tail of the pancreas suggests that, on a per
eight basis, there are fewer cells and more con-
ective tissue or other structural elements in
his segment. It is concluded that there is meta-
olic uniformity in the rat pancreas and that one
egment of the pancreas may be considered to be
epresentative of the entire pancreas metabolically.

374 EFFECT OF PANCREATIC POLYPEPTIDE ON DNA-SYNTHESIS IN THE PANCREAS. (Eng.) Green-
erg, G. R.; Mitznegg, P.; Bloom, S. R. (Royal
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xperientia 33(10):1332-1333; 1977.

 study was carried out in 48 male Sprague-Dawley
ats that had been fasted for 24 hr to determine
hether pancreatic polypeptide (PP) has any trophic
ffect in the gastrointestinal tract and to estab-
ish whether PP can influence the trophic action
f cholecystokinin (CCK). Four groups of 12 rats
ach received single i.p. injections of NaCl
group I, control), CCK-octapeptide (CCK-OP, 18
mol/kg, group II), bovine PP (BPP, 12 nmol/kg,
roup III), or both CCK-OP and BPP (same doses,
roup IV). After 15 hr, each animal received an
njection of 0.5 mCi/kg ^{3}H-thymidine, and all ani-
als were sacrificed at 16 hr and the liver, pan-
reas, duodenum, and oxyntic area of the stomach
xamined for incorporation of label. The drugs
ad no significant effect on DNA synthesis in
ither the liver or duodenum. In the pancreas,
he extent of DNA synthesis was significantly in-
reased by both CCK-OP ($p<0.05$) and BPP ($p<0.01$)
ompared with the control; BPP did not affect the
nhancement elicited by CCK-OP. The extent of DNA
ynthesis was increased twofold by all three treat-
ents; the level following CCK-OP plus BPP treatment
as significantly greater than the control value
$p<0.005$). Although in the duodenum, both CCK-OP,
P, and the combined drugs enhanced the ex-
ent of DNA synthesis 50% compared with controls,
he differences did not reach statistical signif-
cance. BPP has a trophic effect on the pancreas
d duodenum, but it neither augments nor inhibits
he trophic action of CCK-OP.

75 EFFECT OF EXPERIMENTAL HEMORRHAGIC PANCREATITIS ON RESPIRATORY FUNCTION AND
LMONARY PHOSPHOLIPIDS. (Eng.) Dougall, A.
; Brennan, M. M.; Wong, C. Y.; Harding, P. G.
; Possmayer, F.; Ahmad, D.; *et al.* (Univ. Hosp.,
iv. Western Ontario, London, Ontario, Canada).
rg. Forum 28:189-191; 1977.

 study was undertaken to correlate the degrada-
on of pulmonary phospholipids with the deter-
oration of pulmonary function during acute pan-
reatitis in dogs. Acute pancreatitis was in-
ced in five dogs by the transduodenal injection
 0.5 ml/kg of autologous bile; controls were
am operated. Normal saline (10 ml/kg/hr, i.v.)
s given during the whole 12-hr experiment, during
ich respiratory function was measured and after
which the animals were sacrificed and phospholipids recovered from lung lavages and sera for analysis by two-dimensional thin-layer chromatography. Phospholipase A activity was also determined. Controls demonstrated an improvement in respiratory function over 12 hr, but dogs with pancreatitis suffered a deterioration in function after an initial improvement during the first 8 hr. Lung wash from control dogs contained a greater amount of phospholipid (3.32 ± 0.487 mg/kg body weight) than did lung wash from dogs with pancreatitis (2.11 ± 0.225 mg/kg). The phospholipid composition was similar in both groups (phosphatidyl choline and lysolecithin were 75% and 1.09%, resp., in the control group and 70% and 1.52%, resp., in the experimental group of the total phospholipid) and both components lowered surface tension (in an artificial alveolus machine) to the same degree. Phospholipase A activity was markedly increased in the serum and lung wash of dogs with pancreatitis compared with control dogs. Despite the deterioration of pulmonary function in acute pancreatitis, degradation of pulmonary phospholipids is not detected. Elevated phospholipase A activity in acute pancreatitis does not alter pulmonary surfactant within the first 12 hr of pancreatitis.

7376 TIME COURSE OF PANCREATIC PROTEIN SYNTHESIS FOLLOWING FEEDING. (Eng.) Malo, C.; Morisset, J. (Dept. Biology, Sherbrooke Univ., Sherbrooke, Quebec J1K 2R1, Canada). *Am. J. Dig. Dis.* 23(1):6-8; 1978.

To establish whether the effects of pancreozymin (PZ) and secretin (SE) on the exocrine pancreas are physiological, the effects of feeding on pancreatic protein synthesis were investigated in male albino Sprague-Dawley rats fasted for 24 hr and then fed five consecutive 1-hr meals of ground rat chow (morning and evening for 2 days plus the 3rd morning). After another 24-hr fast, control rats went unfed but experimental animals were fed for 15 min; rats were sacrificed at 15-min intervals between 15 and 120 min after the last meal. ^{3}H-L-phenylalanine (^{3}H-L-phe, 10 Ci/mmol, 10 μCi) was injected 10 min before sacrifice, and then the pancreas was homogenized for study. The free intrapancreatic ^{3}H-L-phe pool did not change significantly over time. But the incorporation of the radiolabel into protein was significantly reduced ($p<0.001$) 45 min after the end of the meal and significantly increased by 90 min ($p<0.05$) and 105 min ($p<0.02$) after the meal compared with controls. The rate of incorporation returned to the control level by 120 min. The results show that feeding induces variations in total pancreatic protein biosynthesis *in vivo*; these variations are similar to those previously observed with PZ and SE, indicating that the changes observed following hormonal stimulation are physiological.

7377 SOMATOSTATIN THERAPY OF ACUTE EXPERIMENTAL PANCREATITIS. (Eng.) Lankisch, P. G.; Koop, H.; Winckler, K.; Folsch, U. R.; Creutzfeldt,

W. (Dept. Medicine, Univ. Gottingen, Gottingen, W. Germany). *Gut* 18(9):713-716; 1977.

Because somatostatin (SRIF) reduces exocrine pancreatic secretion, its effect on acute experimental pancreatitis was investigated in the rat. Acute pancreatitis was induced in 45 male Wistar rats by the retrograde injection of 0.6 ml of 0.8, 2.0, or 3.0% Na-taurocholate into the pancreatic ducts; linear SRIF was given s.c. during the operation as a 200-μg bolus and by infusion (100 μg/100 g body weight) for 3 hr after, while controls received saline infusions. Rats were sacrificed 1 hr after treatment was stopped. SRIF therapy significantly lowered the serum lipase levels in all three groups ($p<0.05$ for 0.8 and 3%, $p<0.001$ for 2%) and the serum amylase level in the 0.8% group ($p<0.02$). Ascites amylase and lipase and pancreatic amylase and trypsin levels as well as the degree of pancreatic necrosis, edema, and WBC count were not affected by SRIF. When the same protocol was used to induce 2%, 2.5%, or 3% Na-taurocholate pancreatitis in 56 rats, all rats (SRIF-treated and control) in the 3% group died within 20 hr, 50% of the treated and 50% of the control rats survived in the 2.5% group, and 73% of the treated and 75% of the control rats survived in the 2% group. SRIF does not appear to be effective in the treatment of acute pancreatitis.

7378 INHIBITORY EFFECT OF SOMATOSTATIN ON HUMAN PANCREATIC POLYPEPTIDE SECRETION. (Eng.) Marco, J.; Hedo, J. A.; Villanueva, M. L. (Clinica Puerta de Hierro, Universidad Autonoma, Madrid, Spain). *Life Sci.* 21(6):789-791; 1977.

The effect of somatostatin on the secretion of human pancreatic polypeptide (HPP) was investigated in five patients who had undergone subtotal gastric resection with Billroth I or Billroth II reconstruction due to benign ulcer disease. Overnight fasted patients underwent an oral glucose tolerance test (OGTT) during which plasma HPP levels were determined. Glucose (1.75 g/kg) was taken 60 min after starting a somatostatin (9 μg/min after an initial 250 μg bolus) or saline infusion; the entire test lasted 3 hr. The mean fasting plasma HPP level was 65 ± 10 pg/ml. Glucose ingestion during saline infusion caused a prompt elevation of the plasma HPP level ($p=0.02$, $p=0.01$, $p=0.006$, and $p=0.01$ at 10, 15, 20, and 30 min, resp.). When somatostatin was infused, the plasma HPP level was depressed compared with the basal level ($p=0.0007$-0.005), and the HPP response to p.o. glucose was completely abolished. These results demonstrate that somatostatin is a potent inhibitor of pancreatic polypeptide secretion in man.

7379 EXOCRINE PANCREATIC RESPONSE TO THE VENOM OF THE SCORPION, Tityus trinitatis. (Eng.) Bartholomew, C.; Murphy, J. J.; McGeeney, K. F.; Fitzgerald, O. (General Hosp., Port-of-Spain, Tri dad, West Indies). *Gut* 18(8):623-625; 1977.

Because acute pancreatitis has been reported afte the sting of the scorpion, *Tityus trinitatis*, the effect of its venom on exocrine pancreatic secret was investigated in dogs. A dose of 1 mg/kg veno usually stimulated pancreatic volume, amylase, lipase, and trypsin output. In one dog receiving this dose, pancreatic output was increased from a basal level of 0.42 ml to 0.92 ml, and the amylas lipase, and trypsin levels increased from 0.6 Kal likrein Units (KU) to 10.7 KU, from 47.7 KU to 19 KU, and from 4.1 mg to 16.7 mg, resp. The pancreatic response of one dog to serial injections of venom (1.0 mg/kg) produced an increasing rate of enzyme secretion with repetition of the stimulus. In another dog, venom was administered during a continuous secretin infusion (16 U/hr, i.v.). A very slight increase in volume resulted, but the enzyme output increased from 0.3 KU to 2.8 KU amylase. The concentration of the secreted enzym increased from 0.15 KU to 1.1 KU/ml. The results indicate that venom from *T. trinitatis* evokes enzyme-rich pancreatic secretion.

7380 OLEATE INHIBITS EXOCRINE PANCREATIC SECRETION [Letter to Editor]. (Eng.) Voirol, M.; Capitaine, Y.; Rosenbusch, C. A.; Loizeau, E. (Clinique Universitaire de Medicine Interne H.C., CH 1211 Geneva, Switzerland). *Lancet* 1(8058):274; 1978.

7381 ACTION OF INTRADUODENAL OLEIC ACID ON THE PANCREATIC EXOCRINE SECRETION OF CHRONIC ALCOHOLIC RATS: A FOLLOWED STUDY DURING 1 YEAR [Abstract]. (Eng.) Laugier, R.; Sarles, H. (INSERM U-31, 46 chemin de la Gaye, 13009 Marseille, France). *Digestion* 16(1/2):213; 1977

7382 EFFECT OF GLUCAGON ON DIGESTIVE ENZYME SECRETION FROM ISOLATED PANCREATIC ACINAR CELLS [Abstract]. (Eng.) Singh, M. (Veterans Admin. Hosp., Augusta, GA 30904). *Fed. Proc.* 37(3):809; 1978.

7383 THE HYPOCALCEMIC EFFECTS OF PANCREATIC HOMOGENATES [Abstract]. (Eng.) Apper H. E.; Nakashima, Y.; Howard, J. M. (Medical Col of Ohio, Toledo, OH 43699). *Fed. Proc.* 37(3): 810; 1978.

7384 CHARACTERISTICS OF AN IN SITU ISOLATED AND PERFUSED RAT PANCREAS [Abstract]. (Eng.) Lanoe, J.; Lalande, M.; Morisset, J. (Gastrointestinal Res. Unit, Univ. Sherbrooke,

herbrooke, Quebec J1K 2R1, Canada). *Fed. Proc.*
7(3):809; 1978.

385 THE EFFECT OF CHRONIC ADMINISTRATION OF D-PENICILLAMINE ON THE RAT PANCREAS [Ab-
tract]. (Eng.) Argent, B. E.; Case, R. M.;
mith, P. A.; Sunter, J. P. (Univ. Medical Sch., Newcastle upon Tyne NE1 7RU, England). *Br. J. Pharmacol.* 61(1):120P-121P; 1977.

See also, 7311, 7321, 7322, 7336, 7437, 7453, 7458, 7480, 7751, 7764, 7770, 7779.

SECRETION AND METABOLISM

Hepatobiliary Tract

386 HEPATIC VENOGRAPHY OF NORMAL AND REGENERATING DOG LIVER. (Eng.) Enge, I.;
latmark, A.; Bergan, A. (Rikshospitalet, Oslo 1,
rway). *Scand. J. Gastroenterol.* 13(1):27-32;
978.

otal and selective hepatic vein angiographies
ere performed preoperatively and 6 weeks after
% liver resection in six mongrel dogs to study
e hepatic vein system in the normal and regen-
rating liver. After 6 weeks, the dogs were sac-
ficed for postmortem studies. At 6 weeks post-
eratively, total hepatic venography revealed
5 remaining visible lobar veins, the inferior
na cava, 1 or 2 phrenic veins, and the renal
ins. The inferior vena cava was sometimes slight-
displaced to the left. In one dog, a moderate
t constant narrowing of the inferior vena cava
the level of the diaphragm was seen. The di-
eter of the lobar veins and their major tribu-
ries were increased compared with preoperative
udies, and the lobar veins were elongated and
stributed to a larger mass of hepatic tissue.
e larger subdivisions of the lobar veins were
ven off at strikingly larger angles. Selective
bar vein angiography more distinctly visualized
e smaller peripheral tributaries in the lobes and
owed them to be similar to the preoperative state.
autopsy, the residual livers were all of the
me shape, with the right lateral and caudate
bes obviously increased in size and with thick-
ed, rounded margins, and the regenerated liver
ight was 100-108% of the calculated preoperative
ight. Except for a few small veins emptying
rectly into the inferior vena cava, the hepatic
in anatomy may be evaluated by these angiographic
thods. The results are consistent with previous
dings. The increased diameter of the lobar
ns is probably due to increased blood flow, the
ngation of the vessels and increased angle be-
en the vein radicles to the diffuse growth of
liver remnants, and the narrowing of the in-
ior vena cava in one dog to the surgical pro-
ure.

7387 STUDIES ON SYMPATHETIC INNERVATION OF THE HEPATIC VASCULATURE. (Jpn.) Yamamoto, K. (Kumamoto Univ. Medical Sch., Kumamoto, Japan). *J. Kumamoto Med. Soc.* 51(2):73-89; 1977.

To study sympathetic innervation of the hepatic vasculature, the distribution of norepinephrine fluorescence (NAF) was studied in hepatic arteries and veins of the dog, rabbit, guinea pig, rat, and mouse. Adrenergic receptors were studied in perfused livers by adding sympathetic amines and their blockers to the perfusate. NAF distribution was similar in all species examined. NAF was present in the layer between the adventitia and the media of the intrahepatic artery and the portal vein. NAF was not detected in the hepatic lobuli, including the area adjacent to the central vein. Most of the NAF in the hepatic vein was located in the media, with a small amount in the adventitia. NAF content of the hepatic vasculature was markedly increased after norepinephrine treatment. NAF was markedly decreased after the administration of reserpine. NAF decreased in the hepatic artery and portal vein following periarterial neurectomy in the hepatic hilus or celiac ganglionectomy in rats and dogs, whereas hepatic vein NAF remained unchanged. In perfused canine livers, there was a significant change in flow rate in both the hepatic artery and the portal vein within 30 min of the addition of phenylephrine or isoproterenol to the perfusate. The effects of these drugs were suppressed by phenoxybenzamine or propranolol pretreatment. In the hepatic artery, the flow rate decreased within 30 min of the addition of norepinephrine; this was followed by an increase in the next 30 min of perfusion. Phenoxybenzamine treatment prior to norepinephrine treatment increased the flow rate, whereas propranolol pretreatment decreased the flow rate in the hepatic artery. The flow rate remained unchanged in the portal vein. The results indicate that adrenergic nerve terminals are located between the adventitia and the media of the hepatic artery and portal vein and in the media of the hepatic vein. Alpha- and beta-adrenergic receptors are present in the hepatic artery and the portal vein.

7388 SULFOBROMOPHTHALEIN AND INDOCYANINE GREEN BINDING BY THE HEPATIC CYTOPLASMIC PROTEINS. (Eng.) Namihisa, T.; Nambu, M.; Yamashiro, Y. (Juntendo Univ., Sch. Medicine, 1-1 Hongo 2-chome, Bunkyo-ku, Tokyo, 113 Japan). *Gastroenterol. Jpn.* 12(6):466-468; 1977.

BSP and indocyanine green binding by hepatic cytoplasmic proteins was examined by G-100 Sephadex gel filtration in liver specimens from normal humans, from patients with Rotor's hyperbilirubinemia or the Crigler-Najjar syndrome, and from Wistar rats. In the rat, three peaks, designated X, Y, and Z proteins, were prominent, and preferential localizations of BSP and ICG binding to these proteins were demonstrated. In the human liver, BSP localized to Y protein could hardly be demonstrated, whereas ICG binding was detected. The pattern in the tissues from patients with hyperbilirubinemia or the Crigler-Najjar syndrome was similar to that in the normal subjects. These results suggest that the impaired hepatic organic anion transport in congenital hyperbilirubinemia is probably not related to cytoplasmic organic anion binding proteins.

7389 THE METABOLIC INTEGRITY OF HEPATOCYTES IN SUSTAINED INCUBATIONS. (Eng.) Dickson, A. J.; Pogson, C. I (Biological Lab., Univ. Kent, Canterbury, Kent CT2 7NJ, England). *FEBS Lett.* 83(1):27-31; 1977.

To produce a biochemically verified viable preparation of nondividing parenchymal cells that can be maintained in incubation for 8-12 hr to study hepatic anabolism, the biochemical stability of isolated rat parenchymal hepatocytes incubated in Eagle's minimum essential medium with fetal calf serum (medium B) was studied. The results were compared to those obtained from the same cells incubated with Krebs-Henseleit bicarbonate with bovine serum albumin (medium A). Gluconeogenesis from lactate and ATP content were used as measures of metabolic integrity. Gluconeogenic capacity in hepatocytes from 48-hr starved rats decreased rapidly during a 4-hr incubation in medium A, and this decrease correlated with a decreased hepatocyte ATP content; the decreased ATP content was also found using fed-rat hepatocytes and had a half-life of 2-5 hr. Storage of the cell preparations on ice slowed the metabolic deterioration by 300%. Addition of various substrates, hormones, soybean trypsin inhibitor, and collaginase antibody to medium A did not retard the observed hepatocyte deterioration. However, when hepatocytes were incubated in medium B, the ATP content was maintained for 8 hr of incubation and even at 16 hr was 2.5 times greater than in cells incubated in medium A. The initial cellular activities of lactate dehydrogenase and the ratio of lactate to glutamate dehydrogenases were similar in cells incubated in both media, but the subsequent leakage of lactate dehydrogenase into the medium was greatly retarded in medium B. Although cellular K^+ content was maintained in both media A and B, that of cells in medium B was higher throughout. The results indicate that isolated hepatocytes can be maintained in physiological states for up to 8 hr with little alteration in viability and that medium B appears to be the medium of choice.

7390 BIOCHEMICAL AND ULTRASTRUCTURAL EVALUATION OF ISOLATED RAT LIVER SYSTEMS PERFUSED WITH A HEMOGLOBIN-FREE MEDIUM. (Eng.) Sugano, T.; Suda, K.; Shimada, M.; Oshino, N. (Dept. Veterinary Physiology, Coll. Agriculture, Univ. Osaka Prefecture, Sakai, Osaka 591, Japan). *J. Biochem.* 83(4):995-1007; 1978.

To determine the viability of isolated rat livers perfused with a hemoglobin-free medium devoid of albumin, ultrastructural evaluation and quantitative measurement of several hepatic functions were made in anesthetized male Sprague-Dawley rats perfused in a flow-through mode. The perfusion medium was a mixture of 115 mM NaCl, 5.9 mM KCl, 1.2 mM $MgCl_2$, 1.2 mM NaH_2PO_4, 1.2 mM Na_2SO_4, 2.5 mM $CaCl_2$, and 25 mM $NaHCO_3$. The effect of flow rate on oxygen consumption and changes in the respiratory rate were studied. Ultrastructural changes indicative of liver injury were sought along with changes in metabolism or hormonal response. When the perfusion flow rate was maintained between 3 and 3.5 ml/min/g of liver, all the biochemical parameters measured in the perfused liver system (the rates of glucose, pyruvate, and lactate production, the rate of oxygen consumption, and the tissue contents of adeni nucleotides) were similar to those observed in perfusion systems containing erythrocytes or albumin. Electron microscopy confirmed adeuate preservation of fine structure in all parts of the liver for at least 70 min of perfusion at the flow rate of 3-3.5 ml/min. Hormonal responses demonstrated the operation of integral liver functions in the perfused liver under the experimental conditions. The viability of liver perfused in the hemoglobin- and albumin-free system was confirmed, and this system was found to be equivalent to macromolecule-containing and complex perfusion systems provided an adequate flow rate was employed. The hemoglobin-free system allows analysis by various physicochemical techniques and allows continuous measurement of various parameters. The use of the flow-through mode of perfusion will open a variety of biochemical approaches to the study of hepatic metabolism.

7391 EFFECTS OF PORTACAVAL END-TO-SIDE ANASTOMOSIS ON THE LIVER OF RATS. (Ger.) Rasenack, U.; Grun, M.; Liehr, H. (Medizinische Univ.-Klinik Wurzburg, Josef-Schneider-Str. 2, D-8700 Wurzburg, W. Germany). *Z. Gastroenterol.* 15(11): 680-690; 1977.

The effect of portacaval end-to-side anastomosis on the liver was studied in 117 young rats (liver weight 9.9 ± 1.6 g) and in 33 old rats (liver weight 19.5 ± 1.9 g) and compared with the condition of the liver in 48 sham-operated male Chbb rats. The weight of the liver of the young rats decreased to 7.5 ± 1.7 g 3 days after the operation; the hepatic atrophy was also accompanied by a reduction of the body weight. The cell necrosis of the hepatic parenchyma was most intense during the first 2 weeks, especially during the 2nd and 3rd days after operation. Complete necrosis of the hepatic epithelium and of the reticuloendothelial system was seen in the old rats 48 hr after operation. No particular changes were seen in the livers of the sham-operated rats. Less marked necrosis of individual cells or cell clusters was seen in both groups even after 5-8 months, at a time when endotoxinemia was detected in 85% of the animals by the Limulus test. Loss of glycogen on the peripheries of the lobules and varying degrees of hemosiderosis were seen several months after operation. The atrophic and necrotic alterations seen immediately after operation were due to hemodynamic disorders, because the hepatic artery, although dilated to the maximum, was unable to compensate for the decrease in the portal blood flow. The late necrotic changes were, however, due to endotoxinemia rather than to persisting hemodynamic disorders.

7392 EXPERIMENTAL STUDIES ON HEPATIC HEMODYNAMICS AND FUNCTION IN POSTSINUSOIDAL BLOCK.

(Eng.) Kawabe, K.; Yokota, T.; Mizumoto, R.; Honjo, I. (Faculty Medicine, Kyoto Univ., Sakyo-ku, Kyoto, 606, Japan). *Arch. Jpn. Chir.* 46(5):551-562; 1977.

Hemodynamic changes and liver function were investigated in post- and presinusoidal block in 47 adult mongrel dogs. There were two treatment groups; in group 1, the right branches of the portal vein and the left hepatic vein were ligated to produce presinusoidal block in the right half and postsinusoidal block in the left half of the liver and in group 2, the left hepatic vein was constricted with tape before construction of the portacaval anastomosis. In both acute and chronic (8 weeks after operation) experiments, there was reversed flow from the left half of the liver into the portal vein in group 1. The ratio of blood flow per gram of liver in the right to that in the left half was 1:0.602 in the acute experimental group and 1:0.984 in normal dogs ($p<0.05$). In the chronic group, the hepatic artery flow was the same in the left and right halves, indicating a return to normal flow after the initial acute block. In group 1, the ratio of bile flow from the right to that from the left half of the liver in both acute and chronic conditions showed no significant difference. In the acute tests, there was no difference in BSP excretion between the two liver sections; in the chronic group, however, BSP excretion from the liver lobes with postsinusoidal block was significantly reduced ($p<0.05$). There was severe damage (necrosis and vacuolar degeneration) to the left half of the liver but few changes in the right half in group 1 after 8 weeks. There was little damage to liver cells and no fibrosis in group 2 dogs. In dogs from group 2, the arterial blood entering the left half of the liver flowed out partly via the constricted hepatic vein and partly via the portal vein in a reversed flow. These results indicate that liver function may decrease due to the ineffectiveness of the hepatic artery reversed flow even when the liver cells show only mild changes.

7393 THE DEMONSTRATION OF PHARMACOLOGICALLY ACTIVE SUBSTANCES IN THE PORTAL VEIN BLOOD OF DOGS AFTER THE LIGATION OF THE SUPERIOR MESENTERIC ARTERY.

(Ger.) Wedell, J.; Schmutzler, W.; Kayser, D. (Chirurgische Klinik, Kreiskrankenhaus, D-4900 Herford, W. Germany). *Langenbecks Arch. Chir.* 344(2):131-140; 1977.

The effect of ligation of the superior mesenteric artery on the concentrations of pharmacologically active substances (serotonin, kinins, catecholamines, histamine, and prostaglandin-$F_{2\alpha}$) in the portal vein blood was studied in male and female dogs. The serotonin concentration increased from 0.932 ng/ml in the controls to 0.94 ng/ml during the ligation, and from 0.72 to 5.12 ng/ml during the reopening of the occluded artery. During occlusion, the catecholamine concentration was 0.83 ng/ml versus 0.41 ng/ml in the controls; during reopening, the concentrations were 0.33 ng/ml in the controls, and 0.37 ng/ml in the experimental animals. The kinin concentrations were 0.02 and 0.01 ng/ml in the controls during occlusion and reopening, resp.; the corresponding levels in the experimental animals were 0.064 and 0.04 ng/ml. The histamine levels were 11.5-16.5 ng/ml during occlusion and 11.8-14.3 ng/ml during reopening in the control animals versus 14.5-14.7 ng/ml and 14.8-15.5 ng/ml, resp., in the experimental group. The prostaglandin level was increased only immediately after the occlusion and the reopening of the superior mesenteric artery. While the additive effect of the subthreshold concentrations of these substances cannot be excluded, the measured concentrations in the portal vein blood were too low to be responsible for the development of peptic erosions of the stomach as observed after occlusion of the superior mesenteric artery.

7394 THE EFFECT OF ACUTE ETHANOL ADMINISTRATION ON PHOSPHORYLETHANOLAMINE UPTAKE AND METABOLISM IN RAT LIVER SLICES.

(Eng.) Corazzi, L.; Arienti, G.; Tirillini, B.; Arienti, U. G.; Porcellati, G.; Orlando, P. (Medical Sch., 06100 Perugia, Italy). *Farmaco (Sci.)* 32(8):614-621; 1977.

The possibility that phosphorylethanolamine (PE) is incorporated into liver phospholipids in both normal and acutely ethanol-intoxicated female Wistar rats was investigated using an *in vitro* assay employing liver slices and both ^{14}C-PE and ^{32}P-PE. Experimental and control rats were fasted for 12 hr, then received either 50% ethanol (6 g/kg, single p.o. dose) or 0.9% saline (7.5 mg NaCl/100 g, single p.o. dose), and were sacrificed 8 hr later. Triacylglycerols accumulated in the livers of ethanol-treated rats (8.19 ± 0.90 μmol/g tissue) compared with controls (3.85 ± 0.56 μmol/g). The ratio of $^{32}P:^{14}C$ in PE in the liver was very close to 1 (the theoretical value) after 10-15 min of labeling (and was no less than 0.66 after 60 min), indicating that PE was not hydrolyzed before uptake by liver cells; the ratio was similar at each time point in treated and control animals, indicating no significant differences in uptake between the two groups. Some of the PE was hydrolyzed to free ethanolamine (EA) and orthophosphate, the hydrolysis being less pronounced in the treated rats (77.89 ± 17.35 and 117.57 ± 26.69 nCi labeled EA/g tissue in treated and control rats, resp.). Ethanolamine glycerophospholipids (EPG) were strongly double-labeled to similar extents in both treated and control rats; the labeling ratio was very high initially (0.83 in both groups after 10 min of labeling) and fell to 0.47 and 0.37 in treated and control rats, resp., after 60 min of labeling, indicating that PE was incorporated into EPG without being hydrolyzed. After the longer incubation times (30-60 min), choline phosphoglycerides (CPG) were also found to be labeled, indicating that some EPG were methylated into choline compounds (at 60 min, about 20% of total lipid radioactivity in the liver was confined to (CPG). It is concluded that PE is taken up as such into liver cells and is incorporated into EA and CPG in both normal and ethanol-intoxicated rats.

7395 IN VIVO SIGNIFICANCE OF THE MICROSOMAL ETHANOL OXIDIZING SYSTEM (MEOS). (Eng.)

Khanna, J. M.; Kalant, H. (Dept. Pharmacology, Univ. Toronto, Toronto, Ontario M5S 1A8, Canada). *Adv. Exp. Med. Biol.* 85A:281-302; 1977.

Studies on the *in vivo* significance of the microsomal ethanol oxidizing system (MEOS) are reviewed. There were no significant differences between alcohol-naive rats treated with CCl_4 (which decreases MEOS activity) and controls in the disappearance rate of ethanol from the whole body or the blood, suggesting that MEOS does not play a significant role in ethanol metabolism *in vivo* in the naive rat. The results of tests using rats pretreated with phenobarbital or chlorcyclizine, inducers of drug metabolism, support this conclusion. In these tests MEOS activity was significantly increased, but there was no difference in the ethanol metabolism rate in treated rats. The chronic administration of ethanol in a high fat, adequate protein diet resulted in a significant increase in MEOS activity but had no effect when given with a high protein, low fat diet. However, chronic treatment of rats with either type of ethanol-containing diet resulted in a significant increase in ethanol metabolism, also indicating that changes in MEOS are not related to changes in ethanol metabolism. Determination of the cytoplasmic and mitochrondrial $NAD/NADH_2$ ratios in rats treated chronically with ethanol indicates that an adaptive increase in the mitochondrial reoxidation of NADH in the chronic alcohol-treated rat leads to an increase in the ethanol oxidation rate. There is a marked variability in the inductive effect of ethanol on drug metabolism. In some cases (meprobamate) there is an increase in inducibility after chronic ethanol treatment, while in others (pentobarbital) there is no effect. Studies of the acute interaction between ethanol and drugs suggest that ethanol modifies the conformation of the microsomal hemoprotein, impairing its ability to carry out the drug hydroxylation reaction. The rate of ethanol metabolism was independent of dose (0.5, 1.0, 2.0, and 4.0 g/kg, i.p.) but was inhibited 83%-92% in all dose groups by 4-methylpyrazole (2 mmol/kg). These studies fail to support the existence of a non-ADH-mediated pathway of ethanol elimination in the rat. It is concluded that changes in MEOS activity bear no consistent relationship to ethanol metabolism.

7396 LIVER MONOAMINE OXIDASE (MAO) IN LIVER HOMOGENATE OF MICE INFECTED WITH Schistosoma mansoni AND EFFECT OF CERTAIN THERAPEUTIC AGENTS. (Eng.)

Samad, M. M. A.; Guirgis, F. K.; Zeitoun, R.; El-Feki, R. F.; Awadalla, H. N. (Faculty Medicine, Alexandria Univ., Alexandria, Egypt) *Tropenmed. Parasitol.* 28(4):554-559; 1977.

To determine whether measurements of monoamine oxidase (MAO) activity can be useful in assessing the degree of liver fibrosis and its progression with time or its reversal after treatment in hepatosplenic schistosomiasis, MAO activity in liver homogenates of mice infected with *Schistosoma mansoni* was determined from the 2nd to the 14th week following infection. In control animals, MAO activity ranged from 3.96 ± 0.64 to 4.52 ± 0.39 U. In infected animals there was a sharp and significant increase in MAO activity during the 2nd and 3rd week after infection (6.20 ± 0.72 and 6.22 ± 0.25 U, resp., $p<0.01$). The enzyme activity began to decrease at the 6th week (3.94 ± 0.62 U) and reached 0.68 ± 0.22 U ($p<0.01$) at the 8th week after infection. By the 14th week, the level had risen again to 3.38 to 0.73 ($p<0.05$) but the percentage decrease was still significant when compared to the control. Animals were given four different treatment regimens and sacrificed 2 hr after drug administration and at the 1st, 3rd, and 8th days following treatment. Tartar emetic (30 mg/kg i.p. for 5 days) produced a nonsignificant increase in MAO activity in the infected mice, but caused no change in the normal group. Stibophen (300 mg/kg i.p. for 5 days), niridazol (50 mg/kg p.o. for 5 days), and hycanthone (35 mg/kg i.m.) all caused significant increases in MAO activity of infected mice ($p<0.01$ or $p<0.05$, $p<0.01$, and $p<0.01$, resp.). Stibophen and hycanthone caused no significant changes in liver MAO activity of normal mice; niridazole caused a transient but significant ($p<0.05$) increase in MAO activity at 3 hr after the last dose. The increase in the liver MAO activity of treated mice indicates that the livers of these mice are returning to normal and that the formation of new fibrous tissue has stopped. Measurement of MAO activity can be a useful index for the progression or regression of liver fibrosis in bilharzial hepatosplenomegaly.

7397 PORPHOBILINOGEN OXYGENASE INDUCTION BY 2-ALLYL-2-ISOPROPYLACETAMIDE TREATMENT.

(Eng.) Tomaro, M. L.; Frydman, R. B. (Faculdad de Farmacia y Bioquimica, Universidad de Buenos Aires Junin 956, Buenos Aires, Argentina). *FEBS Lett.* 84(1):29-32; 1977.

effect of 2-allyl-2-isopropylacetamide (AIA)
dinistration on 5-aminolevulinic acid synthetase
A-synthetase) and porphobilinogen-oxygenase
B-oxygenase) metabolism was studied in rats.
ale Wistar rats fasted for 24 hr received a s.c.
ection of AIA (250 mg/kg). ALA was present in
ne collected 24 hr after AIA administration, and
imum excretion occurred between 24 and 48 hr
er injection (120 ± 14 nmol). No ALA excretion
present between 48 and 72 hr. PBG was excreted
y between 24 and 48 hr (146 ± 11 nmol). Micro-
al PBG-oxygenase activity in the AIA-treated
s increased simultaneously with ALA and PBG ex-
tion and reached a maximum 48 hr after the AIA
atment. No significant difference in PBG-oxy-
ase activity between the control and the treated
s was found 74 hr after the AIA treatment. The
her values of ALA-synthetase activity were found
the livers excised 24 hr after the AIA treat-
t, while in those excised 48 hr after the treat-
t, the values were almost normal. To examine if
or PBG, or both together, are involved in the
erved PBG-oxygenase induction, they were admin-
ered to rats, and oxygenase activity was ex-
ned. Six-hour urine samples from rats treated
ALA (4, 8, and 12 mg/kg, s.c.) contained 90% of
the excreted ALA and PBG formed at expense of the
ected ALA, in a 7:10 ratio of ALA:PBG. No sig-
cant increase of PBG-oxygenase activity over
rol was detected in ALA-treated animals. When
(8 mg/kg) and PBG (4 mg/kg) were administered
ther, similar results were obtained. About 30%
he injected porphyrin precursors were recovered
he urine samples. These data suggest that the se-
tial induction of ALA-synthetase and PBG-oxygenase
t involve a metabolic response to the problem
xcessive PBG formation.

UDP-GLUCURONYLTRANSFERASE IN PERFUSED RAT LIVER AND IN MICROSOMES: V. STUDIES WITH RATS.

(Eng.) Bock, K. W.; Clausbruch, U. C.
)ttenwalder, H. (Inst. Pharmacology and Toxi-
gy, Univ. Gottingen, D-3400 Gottingen, W. Ger-
). *Biochem. Pharmacol.* 27(3):369-371; 1978.

xplore the consequences of altered enzyme con-
int for glucuronide synthesis by intact tissue,
hthol glucuronidation in perfused livers and in
 microsomes from Gunn rats was studied and com-
 with that in Wistar rats. The formation of
hthol glucuronide and sulfate was found to be
ar, and similar levels of 1-naphthol glucuro-
(0.2 µmol/g tissue) and of UDP-glucuronic acid
0.4 µmol/g tissue) were found in liver tissue
th strains at the end of the perfusion experi-
. The level of UDP-glucuronyltransferase
T) was markedly decreased in Gunn rat micro-
with and without activation (0.7 ± 0.1-14.6
nmol/min/mg protein) compared with Wistar rat
somes (1.5 ± 0.4-50.1 ± 9.7 nmol/min/mg pro-
. The solubilized Gunn-rat enzyme appeared
less stable upon storage than was the corres-
ng enzyme preparation from Wistar rats. These
ngs could be explained by assuming either a
tive enzyme and/or abnormal phospholipid en-
interactions in the Gunn rat with glucuronide
esis sustained by compensatory activation of
the latent enzyme. In both Gunn and Wistar rats, such activation was detected in the liver microsomes using bilirubin, but in perfused Wistar rat livers, 7 µmol of bilirubin caused no activation and 43 µmol decreased 1-naphthol glucuronide synthesis to about 70% of normal. UDPGT activity was markedly induced in the microsomes of Wistar rats by 3-methylcholanthrene (specific activity increased about fivefold), but Gunn rat microsomes were unresponsive. UDPGT activity was inducible to the same extent (about twofold) in both strains by phenobarbital. When morphine and chloramphenicol were used as substrates instead of 1-naphthol, microsomal UDPGT activity was similar in both Gunn and Wistar rats both in basal enzyme level (7 ± 2 and 1.0 ± 0.2 nmol/min/mg protein, resp.). These results support the hypothesis that the markedly decreased UDPGT activity (1-naphthol as substrate) in the Gunn rat does not lead to impaired glucuronide formation in perfused livers probably due to compensatory activation of the latent enzyme.

7399 REGULATION OF HEPATIC DRUG METABOLISM BY ELAIDIC AND LINOLEIC ACIDS IN RATS.

(Eng.) Hietanen, E.; Hanninen, O.; Laitinen, M.; Lang, M. (Dept. Physiology, Univ. Koupio, P.O. Box 138, SF-70101 Kuopio 10, Finland). *Enzyme* 23(2):127-134; 1978.

To elucidate the actual role of individual lipid components in the activation of hepatic drug metabolism, the effect of elaidic and linoleic acids on microsomal hydroxylation and glucuronidation reactions was studied in male Wistar rats. The rats were fed a fat-free diet and had elaidic or linoleic acid in doses of 40 and 200 mg/kg injected i.p. every other day for 4 weeks. The rats were then sacrificed and measurements, including body and liver weights and protein, phospholipid, and cholesterol contents of hepatic microsomes (native and trypsin-treated), were made. Pretreatment with either elaidic or linoleic acid altered the fatty acid composition of microsomal phospholipids and decreased the hepatic aryl hydrocarbon hydroxylase and *p*-nitroanisole O-demethylase (PNOD) activity in test rats compared with controls. The UDP-glucuronosyltransferase (UDP-GT) activity was lowered 20% by both acids at both doses compared with controls when *p*-nitrophenol was used as an aglycone; trypsin digestion did not reveal any latent changes in the UDP-GT activity. At the 40 mg/kg dose, linoleic acid-treated rats had significantly ($2p<0.01$) higher body weights than did controls. At 200 mg/kg of linoleic acid, a nearly significant ($2p<0.05$) decrease in body weight was noted. At the higher dose level, linoleic acid produced a nearly significant ($2p<0.05$) decrease in the amount of microsomal protein (both native and trypsin-treated). The activity of microsomal NADPH cytochrome c reductase and microsomal cytochrome P-450 contents were decreased by the higher dose of linoleic acid. Elaidic acid-treated rats had a slightly higher body weight than did controls, and the 200 mg/kg dose decreased the PNOD activity by about 60%, suggesting high sensitivity of this enzyme to elaidic acid. The experiments show that i.p.-administered fatty acids decrease the activities of mixed-function oxygenase enzymes as well as the UDP-GT activity, possibly by changing the phospholipid component in the microenvironment of membrane-bound enzymes. The changes are dependent on the fatty acid dose and may be enzyme specific.

7400 INHIBITION OF HEPATIC METABOLISM OF AZATHIOPRINE IN VIVO. (Eng.) Kaplowitz, N.; Kuhlenkamp, J. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *Gastroenterology* 74(1):90-92; 1978.

To determine whether the hepatic thiolysis of azathioprine mediated by glutathione is enzymatic or nonenzymatic *in vivo*, the effects of probenecid (a glutathione *S*-transferase exogenous inhibitor) and of bilirubin (an endogenous inhibitor) on hepatic azathioprine metabolism were studied in rats. Male Sprague-Dawley rats received azathioprine (100 μmol/100 g) i.p. One group of rats received probenecid (50 μmol/100 g) at 30 and 5 min before azathioprine administration and the controls received saline. Male homozygous Gunn rats received azathioprine, and male Wistar rats served as controls. Azathioprine administration in the Sprague-Dawley rats resulted in 50% depletion of hepatic glutathione content at 5 min and in 80% depletion by 10 min. Probenecid pretreatment caused this depletion to decrease to 22% at 5 min and to 40% at 10 and 15 min ($p<0.001$ for azathioprine plus probenecid versus azathioprine alone at 5, 10, and 15 min). Less hepatic glutathione depletion was also found in hyperbilirubinemic Gunn rats; at 5 and 15 min, only 26% and 40% depletion of hepatic glutathione had occurred, whereas the levels in the controls were 50% and 80% at 5 and 15 min, resp. ($p<0.02$). The findings indicate that the conversion of azathioprine to 6-mercaptopurine *in vivo* is mediated enzymatically by the glutathione *S*-transferases.

7401 COLESTIPOL HYDROCHLORIDE, A NEW HYPOLIPIDEMIC DRUG: A TWO-YEAR STUDY--SUMMARY. (Eng.) Cooper, E. E.; Michel, A. M. (Santa Rosa Medical Center, San Antonio, TX). *Adv. Exp. Med. Biol.* 82:191-194; 1977.

The results of a 2-yr study on the potential use of colestipol hydrochloride as a hypolipemic drug are summarized. A randomized, placebo-controlled, single-blind study was carried out in 152 subjects, among whom 99 hyperlipemic (cholesterol >250 mg/100 ml) patients completed the 2-yr study. Within this group, 60 were treated with colestipol (5 g, t.i.d.), and the others were treated with placebo (Avicel). The serum cholesterol level decreased in the treated subjects from a pretreatment value of 300 mg/100 ml to 250 mg/100 ml after 1 month, to 267 mg/100 ml after 6 months, to 262 mg/100 ml after 1 yr, and to 279 mg/100 ml after 2 yr. The serum cholesterol level changed little in the 39 randomized placebo group. The drug caused no significant side-effects. It is concluded that colestipol hydrochloride effectively depresses cholesterol, but the hepatic synthesis of bile apparently compensates for the lowering of the total bile acid pool; therefore, no lithogenic milieu was produced.

7402 THE EFFECT OF DOPAMINE ON RENAL FUNCTION IN DOGS WITH CHRONIC LIGATION OF THE COMMON BILE DUCT. (Ger.) Benko, H.; Mostbeck, A. Peschl, L.; Schuller, J.; Neumayr, A. (I. Chirurgischen Universitatsklinik Wien, Vienna, Austria). *Wien. Klin. Wochenschr.* 89(16):562-566; 1977.

The effects of long-term (16-day) ligation of the common bile duct on the glomerular filtration rate (GFR), renal plasma flow (RPF), and urinary sodium excretion were studied in 12 male dogs during dopamine infusion (4 μg/kg/min). Administered before ligation, dopamine caused significant increases in GFR, RPF, and the urinary sodium excretion. Ligation without dopamine had no significant effect on GFR and RPF, but it slightly reduced the urinary sodium clearance. In the dogs with common bile duct ligation, dopamine had no significant effect on GFR and RPF, but it reduced the increase in the urinary sodium clearance from the 222.5% measured before ligation to 62.8%. The findings indicate the possible effectiveness of dopamine treatment in obstructive jaundice with renal failure.

7403 THE EFFECT OF FASTING ON GALACTOSAMINE INDUCED HEPATITIS IN EXPERIMENTAL ANIMAL (Eng.) Pickering, R. W. (Roussel Lab. Ltd., Kingfisher Drive, Covingham, Swindon, Wiltshire, England). *Arzneim. Forsch.* 27(10):1992-1996; 1977.

Because of the known alterations of metabolic processes during periods of fasting, the effect of fasting on galactosamine hepatitis was studied in male Sprague-Dawley rats and male hamsters fasted for 24 hr. The rats received 500, 1,000, or 1,500 mg/kg of galactosamine i.p. and the hamsters received 200, 400, or 800 mg/kg i.p. before or afte fasting in all cases. Liver damage was assessed by determining serum transaminase and liver glycogen levels. Fasting after galactosamine treatmen did not alter the course of liver injury in rats. Liver glycogen levels were significantly lower than normal after either fasting or galactosamine treatment alone (1,500 mg/kg) in rats ($p<0.05$) an after galactosamine treatment in hamsters. In ra fasted and treated with galactosamine, the liver glycogen content was significantly higher than that in controls ($p<0.05$). Fasting did not cause any alteration in the reduced liver glycogen leve in galactosamine-treated hamsters. Fasting cause no change in the SGOT or SGPT levels in untreated rats. Galactosamine (1,500 mg/kg) caused a significant increase in liver transaminase levels in nonfasted rats, whereas these levels were within normal limits in fasted rats. Galactosamine trea ment in unfasted hamsters caused increases in SGO and SGPT levels, whereas these increases were not seen in hamsters fasted 24 hr prior to galactosamine treatment. Galactosamine hepatitis is modi fied by previous fasting in rats and hamsters.

04 EFFECT OF GLUTATHIONE ON THE ACTIVITY
OF BILIRUBIN-BINDING PROTEINS FROM RAT
/ER CYTOSOL. (Eng.) Meuwissen, J. A. T. P.;
egers, M.; Srai, K. S.; Ketterer, B. (Dept. Medi-
l Res., Katholieke Universiteit Leuven, B-3000
ıven, Belgium). *Biochem. Soc. Trans.* 5(5):1404-
)7; 1977.

e hypothesis that reduced glutathione (GSH) is
quired to maintain the binding properties of
.irubin-binding proteins in the cytosol was tested
investigating the effects of GSH on the binding
bilirubin by protein components of rat liver
osol during a zone fractionation. Gel filtration
Gunn rat liver cytosol using Sephadex G-100
lded three bilirubin-containing fractions. The
st, eluted with the void volume, consisted either
colloidal bilirubin or of bilirubin associated
h small microsomal fragments. The second and
rd fractions coincided with ligandin and protein
resp. Total bilirubin recovery was only 50%, of
ch the largest part was found at the void volume.
gel filtration was carried out in a GSH-contain-
buffer, the recovery of bilirubin was complete;
e was found at the void volume, and the fraction
responding to ligandin contained 60-80% of the
ment. Gel filtration of mixtures of Gunn rat
er cytosol and Wistar rat plasma without the
ition of GSH, showed that protein A carried the
atest amount of total bilirubin, albumin less,
ligandin the least. In the presence of GSH,
andin bound the most bilirubin and albumin the
st. In neither system was bilirubin found at
void volume. These results show that the bind-
activity of the ligandin fraction for bilirubin
strongly influenced by GSH. The albumin and
protein A fractions might not be affected; if
s is so, they will carry comparatively more of
ligand because of competition with ligandin of
reased affinity. Cytosol proteins bind bili-
n more strongly than does albumin.

BIOTRANSFORMATION AND HEPATOTOXICITY OF
HALOTHANE. (Eng.) Brown, B. R.; Sipes,
. (Univ. Arizona Coll. Medicine, Tucson, AZ
1). *Biochem. Pharmacol.* 26(22):2091-2094; 1977.

rature concerning the mechanism of halothane
totoxicity is reviewed. Evidence from animal
riments suggests that the hepatic necrosis pro-
d by this anesthetic could be due to quali-
vely and/or quantitatively altered biotrans-
ation of halothane to reactive intermediates,
icularly via a reductive or oxygen-deficient
vay. Lipid peroxidation and extensive covalent
ing of halothane metabolites may occur, but may
fects, rather than causes. It is possible,
has not been proven, that these new substances
d induce a hypersensitivity phenomenon ac-
rating hepatic cellular destruction. Further
stigations into the precise mechanisms and
ation of halothane biotransformation should be
ied out.

REGULATION OF RAT ALPHA-FETOPROTEIN PRODUCTION BY METHIONINE AND ADENOSINE 5'-TRIPHOSPHATE. (Eng.) Watanabe, A.; Nagashima, H. (Okayama Univ. Medical Sch., 5-1, 2-chome, Shikata-cho, Okayama, Japan). *Res. Exp. Med.* 172(1):71-74; 1978.

Studies were carried out to determine whether a methionine-related metabolic event(s) is related to the repression of alpha fetoprotein (AFP) production seen after birth. The s.c. injection of methionine (2 mg/day) simultaneously with ATP (6.8 mg) and the injection of prednisolone (0.5 mg) both significantly accelerated the rapid fall of serum AFP concentration after birth ($p<0.025$ in both cases) in male and female Sprague-Dawley rats. Separate administration of methionine or ATP produced no similar effect. Serum and small intestinal extracts from adult rats showed similar effects on serum AFP levels, but the changes were not statistically significant. The half-life of AFP in methionine plus ATP-injected animals was almost the same as those in untreated controls, which may suggest that the administration of methionine plus ATP inhibits increased production of AFP or decreases the secretory rate of hepatic AFP into the circulation.

7407 THE METABOLIC EFFECTS OF SODIUM DICHLOROACETATE IN EXPERIMENTAL HEPATITIS IN THE RAT. (Eng.) Johnson, G. A. H.; Alberti, G. M. M. (General Hosp., Southampton SO9 4XY, England). *Biochem. Soc. Trans.* 5(5):1387-1389; 1977.

The hypolactatemic action of dichloroacetate was investigated in experimental liver disease. Liver damage was induced in rats by injecting galactosamine (1 g/kg) i.v. After a 24-hr fast, a basal arterial blood sample was taken, and NaCl (9 g/l, control) or dichloroacetate (300 mg/kg/hr) was infused for 120 min. Galactosamine administration resulted in a mild increase in the blood lactate concentration ($p<0.01$, as compared with that in untreated controls at 0-120 min), whereas the glucose concentration was unchanged. Blood lactate and glucose concentrations were decreased in galactosamine-treated animals, as compared with those in both the controls and those treated with galactosamine alone. For lactate, the differences were significant 30, 60, 90, and 120 min ($p<0.01$, 0.05, 0.01, and 0.01, resp.) when compared with the concentrations in the galactosamine-treated rats. The injection of fructose (1 g/kg, i.v.) in galactosamine-treated animals resulted in a marked increase in blood lactate concentration ($p<0.01$) at 15, 30, 60, and 90 min and in an increase in blood glucose concentration at 15 min ($p<0.01$), when compared with galactosamine-treated rats. The lactate concentrations in rats treated with galactosamine, fructose, or dichloroacetate were also significantly lower than those in rats treated with galactosamine alone ($p<0.01$) at 15-120 min, whereas the glucose concentrations were unaffected. The blood ketone body concentration was unaffected by galactosamine administration, increased by dichloroacetate infusion in galactosamine-treated rats, and decreased by fructose injection in galactosamine-treated rats. Dichloroacetate reverses galactosamine-induced hyperlactatemia and counteracts the effects of fructose infusion. The effects may be explained by activation of pyruvate dehydrogenase both extrahepatically and in the liver.

7408 COMPARISON OF BILIARY EXCRETORY FUNCTION AND BILE COMPOSITION IN MALE, FEMALE, AND LACTATING FEMALE RATS.

(Eng.) Klaassen, C. D.; Strom, S. C. (Univ. Kansas Medical Center, Kansas City, KS 66103). *Drug Metab. Dispos.* 6(2): 120-124; 1978.

The biliary excretion of four xenobiotic drugs that are not biotransformed before excretion was compared to determine whether there are differences in this excretion between male, female, and lactating female rats. The biliary excretion of i.v.-administered phenol-3,6-dibromphthalein disulfonate (DBSP, 100 mg/kg), ^{3}H-ouabain (4 mg/kg), indocyanine green (ICG, 10 mg/kg), and amaranth (200 mg/kg) was studied in Sprague-Dawley rats. The disappearance from the plasma of the four xenobiotics did not differ significantly in male and female rats. The cummulative biliary excretion of DBSP and ouabain was significantly greater ($p<0.05$) in the lactating females. However, the basal bile flow rate in the lactating females was about 50% higher ($p<0.05$) than in the males and nonlactating females. The increase in bile production decreased rapidly after removal of the pups from the dam. It was 74 ± 4 µl/min/kg on day 20 of gestation but only 42 ± 2 µl/min/kg 13 days after parturition. The concentration of phospholipids and cholesterol in the bile of the lactating females was significantly higher ($p<0.05$) than in the bile of the nonlactating females but was similar to that in the bile of the males. The increased bile flow in the lactating females appeared to be due to an increase in canalicular production, since the bile/plasma erythritol concentration ratios were similar in all three groups. Inasmuch as the bile salt concentration did not change in the bile, there appeared to be increases in both the bile salt-dependent and -independent fractions of bile. The increase was due to a more efficient liver rather than to a larger liver, as the weights of the livers (3.8% of body weight) were similar in all three groups.

7409 METABOLISM OF BILE ACIDS IV. ABSORPTION, DISTRIBUTION, EXCRETION, AND METABOLISM OF ORALLY ADMINISTERED URSODEOXYCHOLIC ACID IN RATS.

(Eng.) Ota, M.; Isobe, J.; Tsuji, Y.; Kuramoto, T.; Hoshita, T. (Hiroshima Univ. Sch. Medicine, Hiroshima, Japan). *Hiroshima J. Med. Sci.* 26(4):233-251; 1977.

The absorption, distribution, excretion, and metabolism of ^{14}C-labeled ursodeoxycholic acid (30 mg/kg p.o. or i.v. as a single dose or once daily for 21 days) in male and pregnant female Wistar rats were studied. The bile acid was absorbed rapidly (>70% within 2 hr) by passive diffusion (the time course was a straight line) and was distributed along with its metabolites only in the hepatobiliary system and gastrointestinal tract. The greater amount was in the latter site, suggesting that the main pool of ursodeoxycholic acid is in the small intestine. There was no accumulation of bile acid, which was excreted primarily in the feces with negligible amounts in the urine and respiratory CO_2. The half-life of ursodeoxycholic acid after a single p.o. dose was 2.3 days and after 21 p.o. doses was 1.5 days. There was a conspicuous transportation of the bile acid through the placenta with distribution in the fetal liver and intestine, but there was little secretion in the milk. The bile acid disappeared more rapidly from the fetus than from the maternal intestine. Ursodeoxycholic acid was converted to tauroursodeoxycholate in the liver, and the latter was partially converted to tauromuricholate. The conjugated bile acids, which represented >70% of the input radioactivity, were hydrolyzed to the corresponding free bile acids in the colon, and lithocholic acid and hyodeoxycholic acid were formed, resp., in the intestine as further metabolic products. The latter metabolites and muricholic acid were the major metabolites excreted in the feces. A metabolic scheme for ursodeoxycholic acid is presented; its metabolic fate closely resembles that of chenodeoxycholic acid except that fewer 6-hydroxylated metabolites are formed, suggesting that the liver enzymes responsible for metabolizing these two bile acids cannot metabolize them to the same extent.

7410 STUDIES ON LIPID METABOLISM IN RATS FED ON HIGH FAT AND HIGH CARBOHYDRATE DIETS WITH REFERENCE TO THE INDUCTION OF FATTY LIVER. PART I. BIOCHEMICAL OBSERVATIONS.

(Eng.) Sato, F.; Mizunuma, T. (Sch. Medicine, Tokushima Univ., Tokushima, Japan). *Tokushima J. Exp. Med.* 24(3/4): 95-104; 1977.

To learn whether the factors that control hepatic triglyceride synthesis contribute to the etiology of lipemia induced by carbohydrate and of fatty liv induced by fat, changes in enzyme systems concerned with triglyceride synthesis were studied in male Wistar rats given high carbohydrate or high fat die Disc-electrophoresis of serum lipoproteins showed t the very low density lipoprotein fraction was much greater in rats fed the carbohydrate diet than in rats fed the fat diet, the triglyceride and cholesterol levels being significantly increased in the latter group at several sampling times ($p<0.05$). This finding indicated that the increased liver lipid content of rats on the high fat diet was due mainly to increased triglyceride. The serum triglyceride level was significantly higher in the animals on the high carbohydrate diet (97 ± 9 mg/dl) than in those on the high fat diet (34 ± 5 mg/dl, $p<0.05$), as were the activities of glucokinase (20.1 ± 1.4 versus 11.0 ± 0.9 µmol/min, $p<0.05$) and acetyl-coenzyme A carboxylase (2.3 ± 0. versus 1.8 ± 0.1 µmol/min, $p<0.05$). The serum leve of ketone bodies and the activities of phosphoenolpyruvate carboxykinase, glycerol kinase, acyl-CoA synthetase, and diacylglycerol acyltransferase were significantly higher in the animals on the high fat diet than in those fed the high carbohydrate diet (1.49 ± 0.24 versus 0.84 ± 0.16 µmol/ml, 75.6 ± 4.6 versus 45.3 ± 3.4 µmol/min, 29.0 ± 1.7 versus 20.0 ± 2.1 µmol/min, 0.91 ± 0.04 versus 0.71 ± 0.05 µmol/min, and 1.76 ± 0.12 versus 1.24 ± 0.1 µmol/

resp., $p<0.05$ in all cases). The serum levels
holesterol, phospholipid, free fatty acid, and
ose; the activities of α-glycerophosphate de-
ogenase and cholinephosphotransferase; and the
rporation of ^{14}C-leucine into liver protein
similar in the two groups. These results sug-
that excess triglyceride formation over phos-
ipid formation might have an unfavorable effect
ipoprotein formation in rats on the high fat
or that triglyceride might be combined with
pholipid and secreted easily as lipoprotein in
on the high carbohydrate diet.

STUDIES ON LIPID METABOLISM IN RATS FED
ON HIGH FAT AND HIGH CARBOHYDRATE DIETS
REFERENCE TO THE INDUCTION OF FATTY LIVER.
II. ELECTRON MICROSCOPIC HISTOCHEMISTRY.
) Sato, F.; Mizunuma, T. (Sch. Medicine,
hima Univ., Tokushima, Japan). *Tokushima J.
Med.* 24(3/4):105-112; 1977.

ucidate the structural changes that occur
ver cells as the fat content increases,
elationship between the formation of fat
ets and abnormalities in the organelles
g the development of fatty liver was studied
ght and electron microscopy in male Wistar
fed a high fat or high carbohydrate diet.
24 hr of the high fat diet, numerous os-
ilic particles appeared in the hepatic cells
sinusoidal surface and in the Golgi appa-
adjacent to the space of Disse. After 72
rge (0.3-1.7 μm) lipid droplets without lim-
membranes were sometimes found in the cyto-
of liver cells, and they seemed gradually to
se in number and size. Characteristic changes
bservable by light microscopy after 3 and 7
of the high fat diet: large lipid droplets
ocated in the peripheral and intermediate
of the hepatic lobules, while a few small
ts were seen in the central area. After 3
there was a marked increase in the number
id droplets in the liver cells, and the rough
asmic reticulum had lost its lamellar con-
tion and was dilated and empty. After 7
many large lipid droplets with glucose-6-
atase reaction products adhering to their
es were seen in the cytoplasm, but the lipid
s and mitochondria had no detectable enzyme
y. The large lipid droplets may have been
by the fusion of smaller droplets. After
of the high carbohydrate diet, many gly-
ranules were seen between the mitochondria
oplasmic reticulum, but there were vir-
no lipid droplets. The data suggested that
rastructural changes in fatty liver result
e reduction of lipoprotein formation in the
smic reticulum, which is related to the re-
f triglyceride from the liver.

THE EFFECT OF THE GALLBLADDER ON THE
CYCLING FREQUENCY OF THE BILE ACID POOL
Abstract]. (Eng.) von Bergmann, K.
Internal Medicine, Univ. Bonn, Bonn, W.
. *Digestion* 16(4):322-323; 1977.

7413 ADENYLATE CYCLASE, THE BEST PLASMA MEMBRANE MARKER IN THE HUMAN LIVER [Abstract]. (Fre.) Pecker, F.; Duvaldestin, P.; Berthelot, P.; Hanoune, J. (Unite de Recherches, INSERM, U-99, Hopital Henri-Mondor, F 94010 Creteil, France). *Gastroenterol. Clin. Biol.* 1(8/9):717; 1977.

7414 SERUM LEVEL OF TOTAL BILE ACIDS AND CHOLIC ACID PLASMA CLEARANCE AS A LIVER FUNCTION TEST [Abstract]. (Fre.) Poupon, R. Y.; Poupon, R. E.; Petit, D.; Infante, R.; Darnis, F. (Hopital Saint-Antoine, F 75012 Paris, France). *Gastroenterol. Clin. Biol.* 1(8/9):719; 1977.

7415 PHYSIOPATHOLOGY OF BILE SECRETION. (Ita.) Gentilini, P. (III Cattedra di Patologia speciale medica e Metodologia clinica, Universita, Florence, Italy). *Recent. Prog. Med. (Roma)* 63(2): 113-136; 1977.

7416 HEPATOCYTE HETEROGENEITY AND BILE SECRETION IN THE RAT [Abstract]. (Fre.) Balabaud, C.; Gumucio, J. J.; Miller, D. L.; Appelman, H. D. (No affiliation given). *Gastroenterol. Clin. Biol.* 1(8/9):705; 1977.

7417 PHARMACOLOGY OF CHENODEOXYCHOLIC ACID [Abstract]. (Fre.) Roze, C. (Hopital Bichat, 170, boulevard Ney, F 75877 Paris Cedex 18, France). *Gastroenterol. Clin. Biol.* 1(11): 960; 1977.

7418 TOXICOLOGY OF CHENODEOXYCHOLIC ACID. (Fre.) Infante, R.; Bouma, M. E.; Lageron, A.; Levy, V. G. (Unite de Recherches d'Hepatologie [U-9] de l'INSERM, Hopital Saint-Antoine, 75012 Paris, France). *Therapie* 32(4):401-402; 1977.

7419 INFLUENCE OF VARIOUS DIETARY HYDROCARBONS ON THE EFFECT OF THE ADDITION OF CHOLESTEROL. (Ger.) Forster, H.; Heller, G.; Fortmeyer, H. P. (Zentrum der Biologischen Chemie und Tierversuchsanlage der Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt/M., W. Germany). *Z. Ernaehrungswiss.* 16(2):128-139; 1977.

7420 ROLE OF KUPFFER'S CELLS IN HEPATIC IMMUNOSUPPRESSION [Abstract]. (Fre.) Vuitton, D.; Eloy, R.; Vaultier, J. P.; Grenier, J. F. (INSERM, U-61, avenue Moliere, F 67200 Strasbourg Hautepierre, France). *Gastroenterol. Clin. Biol.* 1(8/9):720-721; 1977.

7421 EFFECT OF SPLENECTOMY ON LIVER MACROPHAGES DURING REGENERATION FOLLOWING HEPATECTOMY IN THE RAT [Abstract]. (Fre.) Maes, J. M.; Brouwer, P. J.; Kesteloot, N. (Vrije Universiteit Brussel Institut voor Morfologie, Brussels, Belgium). *Gastroenterol. Clin. Biol.* 1(8/9):715-716; 1977.

7422 MICROCIRCULATION OF THE NORMAL DOG HEPATIC BLOOD BED AND UNDER EXTENSIVE RESECTION OF THE LIVER. (Rus.) Khudajberdyev, R. I.; Bakhadyrov, F. N. (Dept. Normal Anatomy, Medical Inst., Tashkent, USSR). *Arkh. Anat. Gistol. Embriol.* 73 (8):71-74; 1977.

7423 LIGATION OF THE HEPATIC ARTERY IN THE RABBIT. (Fre.) Descottes, B.; Airault, C.; Cubertafond, P.; Moulies, D.; Couillaud, D. (No affiliation given). *Bordeaux Med.* 9(25): 2027-2028; 1976.

7424 EXTRACORPOREAL PERFUSION WITH BABOON LIVER IN THE TREATMENT OF HEPATIC COMA. (Ger.) Fischer, M.; Vogel, G. E.; Bottermann, P. (Chirurgische Klinik rechts der Isar, Technische Universitat, Ismaninger Str. 22, 8000 Munich 80, W. Germany). *Dtsch. Med. Wochenschr.* 102(50): 1862; 1977.

7425 INFLUENCE OF NORMOTHERMIC ISCHEMIA OF THE HUMAN LIVER ON HEPATOCELLULAR BIOLOGY [Abstract]. (Fre.) Huguet, C.; Nordlinger, B.; Conard, J. (Hopital Saint-Antoine, Paris, France). *Gastroenterol. Clin. Biol.* 1(8/9):712-713; 1977.

7426 CLINICAL INVESTIGATION INTO THE PROTECTIVE EFFECT OF 4-AMINO-5-IMIDAZOLE CARBOXAMIDE AND OROTIC ACID ON THE LIVER. (Ger.) Feher, J.; Jakab, L.; Tenczer, J.; Szilvasi, I. (III. Medizinischen Klinik der Semmelweis-Universitat, Mezo Imrie ut 17, H-1430 Budapest VIII, Hungary). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(4):175-179; 1977.

7427 INCREASE IN FATTY ACID STORAGE IN THE ISOLATED LIVER FOLLOWING PROTEIN Z SYNTHESIS INDUCTION BY CLOFIBRATE [Abstract]. (Fre.) Renaud, A.; Foliot, A.; Infante, R. (Unite de Recherches U-9, INSERM, 75571 Paris Cedex 12, France). *Gastroenterol. Clin. Biol.* 1(8/9):719-720; 1977.

7428 SIDE-EFFECTS OF α-METHYLDOPA ON THE LIVER. (Ger.) Zenos, A. (Klinik fur Innere Medizin, Wilhelm-Pieck-Universitat, Rostock, E. Germany). *Z. Gesamte Inn. Med.* 33(3):88; 1978.

7429 EFFECTS OF Fumaria EXTRACT, PROTOPINE AND PAPAVERINE ON THE BILE SECRETION OF THE RAT DURING HYPOCHOLERESIS. (Fre.) Reynier, M.; Lagrange, E.; Haring, J.; Vigouroux, M. (Centre de Recherches Laboratoire Roger-Bellon, 90, rue Marcel-Boudarias, 94140 Alfortville, France). *Trav. Soc. Pharm. Montpellier* 37(2):73-84; 1977.

7430 BLOOD COAGULATION DISTURBANCES OF RATS
AFTER ACUTE LIVER DAMAGE PRODUCED BY D-
GALACTOSAMINE-HCl. (Ger.) Kostering, H.; Riesen
kampff, W. G.; Guerrero, M. A.; Kositzki, H. (Med-
izinische Universitatsklinik, D-3400 Gottingen,
W. Germany). *Z. Gastroenterol.* 15(8):512-527; 19

7431 COMPARISON OF THE PHYSIOLOGICAL EFFECTS
OF PARTIALLY HYDROGENATED HERRING OIL A
COLZA OIL IN THE RAT. PART II. IMMEDIATE AND
MEDIUM-TERM EFFECTS ON THE LIPIDS OF THE HEART,
LIVER AND ADIPOSE TISSUE. (Fre.) Astorg, P. O.;
Cluzan, R. (Centre de Recherches de Dijon, I.N.R.
B.V. 1540, 7, rue Sully, 21034 Dijon Cedex, Franc
Ann. Nutr. Aliment. 31(1):43-68; 1977.

7432 THE HYPOBILIRUBINEMIC ACTION OF NICOPHE
SONE. (Rus.) Pidemskii, E. L.; Mardar
ova, L. G.; Saperova, E. F. (Lab. Biologically Ac
tive Substances, Inst. Natural Sciences, Perm Uni
Perm, USSR). *Farmikol. Toksikol.* 40(5):588-591;
1977.

7433 INDUCTION OF PROLIFERATION OF MICROFIL
MENTS AND CHOLESTASIS BY PHALLOIDIN IN
THE RAT [Abstract]. (Fre.) Dubin, M.; Maurice,
M.; Feldmann, G.; Erlinger, S. (Hopital Beaujon,
F 92118 Clichy Cedex, France). *Gastroenterol. C*
Biol. 1(8/9):709-710; 1977.

7434 MECHANISM OF TILORONE-INDUCED CHOLEST
SIS [Abstract]. (Fre.) Hoenig, V.;
Werner, F. (Centre de Recherche Merrell Interna-
tional, 16, rue d'Ankara, F 67084 Strasbourg Ce
France). *Gastroenterol. Clin. Biol.* 1(8/9):711-
712; 1977.

7435 ULTRASTRUCTURAL STUDY OF ACUTE DEGENE
ATIVE TOXIC HEPATITIS INDUCED BY FELI
VIRUS 3 (FV3) [Abstract]. (Fre.) Bingen, A.;
Kirn, A.; Jendrault, G. L. (Laboratoire de Vir-
ologie, 3, rue Koeberle, 67000 Strasbourg, Fran
Biol. Cell. 29(1):21a; 1977.

See also, 7277, 7279, 7280, 7320, 7451, 7466,
7851, 7858, 7878, 7896, 7904, 7940.

Intestine

436 ENTEROCYTE TURNOVER AND CONTENT IN FAT-FED HAMSTERS. (Eng.) Mansbach, C. M., II Veterans Admin. Hosp., 508 Fulton St., Durham, NC 7705). *Am. J. Dig. Dis.* 23(6):486-492; 1978.

o determine if a physiological basis exists for the ncrease in specific activities of cryptal lecithin-ynthesizing enzymes seen in hamsters fed a fat-upplemented diet, ^{3}H-thymidine incorporation, cel-ular migration rate, and mucosal concentration of NA, protein, and lecithin were measured. Radio-utographic studies showed that the labeling index nd cell migration rate throughout the intestine in he fat-fed hamsters and in the proximal three-uarters of the intestine of the control group were he same. Both parameters were reduced in the dis-al quarter of the control intestine in comparison ith the values in the hamsters fed the fat-supple-ented diet ($p<0.02$ and $p<0.01$, resp.). The protein/NA ratio was significantly increased in the prox-mal three-quarters (a 50% reduction in DNA con-ent) and modestly in the distal quarter of the ntestine of the fat-fed group as compared to con-rols, suggesting cellular hypertrophy. The leci-hin content of the proximal three-quarters of in-estine was the same in both groups but reduced n the distal quarter of the gut of the fat-fed roup ($p<0.0320$). These studies suggest that lipid eeding in the hamster can have profound effects on ntestinal cellular content and turnover.

437 PANCREATIC, GALLBLADDER, AND INTESTINAL RESPONSES TO INTRALUMINAL MAGNESIUM SALTS N MAN. (Eng.) Malagelada, J. R.; Holtermuller, . H.; McCall, J. T.; Go, V. L. W. (Mayo Clinic, 00 First St. SW, Rochester, MN 55901). *Am. J. Dig. is.* 23(6):481-485; 1978.

o investigate further the mechanisms of action of agnesium salts as laxatives and choleretics, an *n vivo* bioassay was used to quantify the effects f duodenal $MgSO_4$ or $MgCl_2$ on the release of chole-ystokinin (CCK) and to compare them with the effects f Ca or fatty acids previously studied under simi-ar conditions. The intraduodenal perfusion of a onabsorbable marker was used to measure pancreatic nzyme outputs in response to intraluminal stimuli, nd total bilirubin outputs and net jejunal fluid ovements were simultaneously quantified in 10 ealthy volunteers. Perfusions of both $MgSO_4$ and gCl_2 at concentrations >6 mM (12, 25, or 50 mM) ignificantly ($p<0.05$) increased trypsin output bove the saline control, and the 50 mM $MgSO_4$ and gCl_2 perfusions significantly ($p<0.05$) increased ilirubin output above the control. In neither ase was there any difference in effect between quimolar concentrations of the two Mg salts. The) mM $MgCl_2$ perfusion inhibited jejunal water ab-orption significantly compared with the saline ontrol ($p<0.01$); the 50 mM $MgSO_4$ perfusion was ore potent and induced a net water secretion when ompared with either the control ($p<0.01$) or the 50 mM $MgCl_2$ perfusion ($p<0.05$). These results demonstrate that magnesium salts exert a moderate stimulatory effect on pancreatic enzyme secretion and gallbladder contraction and that these actions are due to the Mg ion. However, much greater concentrations of Mg than of Ca or oleic acid (results of previous work) were required to exert this effect. Because the overall release of CCK depends on the length of bowel containing CCK-releasing cells that is exposed to a given stimulus, Mg is probably a weak stimulus to these cells or, alternatively, it triggers unidentified neurohormonal mechanisms that reduce its net CCK-like action. The actions of Mg salts on the digestive system are probably due to multiple mechanisms.

7438 ELECTRON IMMUNOHISTOCHEMICAL EVIDENCE FOR THE HUMAN INTESTINAL I CELL AS THE SOURCE OF CCK. (Eng.) Buchan, A. M. J.; Polak, J. M.; Solcia, E.; Capella, C.; Hudson, D.; Pearse, A. G. E. (Hammersmith Hosp., London W12 OHS, England). *Gut* 19(5):403-407; 1978.

Alternate semithin-thin serial sections for light and electron microscopy and antibodies to a synthetic fragment of the midpart of the cholecystokinin-pancreozymin (CCK-PZ) molecule (i.e., 9-20) that was free of cross-reacting subpopulations to gastrin were used to identify the cell source of CCK-PZ. Twenty-five surgical samples of human antrum, duodenum, and jejunum were examined. Scattered endocrine cells within the duodenal and jejunal mucosa were specifically stained by CCK-PZ (9-20), whereas the antrum failed to show any positive staining in the semithin sections. The CCK-PZ cells were then identified at the ultrastructural level on consecutive sections as a homogeneous population of cells with mainly round, sometimes angular, relatively dense granules averaging 260 ± 22 nm in size; the corrected value was 330 nm. I cells as identified by conventional electron microscopy also showed mainly round, compact granules with closely applied membrane, measuring 253 ± 58 nm in size; the corrected value was 322 nm. None of the cells reacting with the CCK-PZ (9-20) antibodies were G cells by conventional electron microscopy. The I cell is the source of CCK-PZ in humans.

7439 MOTILIN RELEASE IN THE PIG. (Eng.) Modlin, I. M.; Mitznegg, P.; Bloom, S. R. (Dept. Surgery, UCLA, Los Angeles, CA). *Gut* 19(5): 399-402; 1978.

Motilin release in the pig was investigated *in vivo* to clarify some of the species differences that seem to exist between the pig, the dog, and man. When 30 cm of distal duodenum and proximal small intestine were perfused with normal sodium chloride for 15 min, motilin levels in the portal vein and peripheral blood remained steady at 62 ± 10.6 pM and

54 ± 9.7 pM, resp. Following acid perfusion (0.1 M HCl at 1 ml/min), the plasma motilin concentration increased to a peak at 15 min of 111.2 ± 9.4 pM in the portal blood and 98 ± 8.6 pM in the peripheral blood, and these levels were maintained until the vascular pedicle of the perfused small bowel was clamped at 30 min. Despite continued perfusion with acid, the mean portal motilin level fell to 41 ± 4.8 pM and the mean peripheral blood motilin level to 38 ± 5.0 pM during clamping. When the vascular clamp was released after 20 min, the motilin level rose to a peak by 10 min (191 ± 23 pM in the portal blood and 180 ± 20 pM in the peripheral blood). Calculation of the disappearance half-time after clamping gave a value of 3.9 ± 0.2 min, with a good straight-line fit (r= 0.992). Ingestion of a 300-g meal did not significantly alter the fasting basal systemic plasma level of motilin (45 ± 6 pM) during a 75-min sampling period. Motilin release appears to be an entirely local phenomenon, and its physiological role remains speculative. It may play a role in mediating the motor response to lowered duodenal pH.

7440 EFFECTS OF HYPOPHYSECTOMY AND HYPOPHYSECTOMY PLUS GROWTH HORMONE ON SECRETIN RELEASE AND ON CONCENTRATIONS OF SECRETIN IN THE DUODENAL MUCOSA. (Eng.) Teichmann, R. K.; Schafmayer, A.; Hill, F. L. C.; Rayford, P. L.; Thompson, J. C. (Univ. Texas Medical Branch, Galveston, TX). *Surg. Forum* 28:375-376; 1977.

A study was carried out to test the effects of hypophysectomy (hypo-x) and hypo-x plus growth hormone (GH) on secretin levels in the blood and in the duodenum of the rat before and after duodenal perfusion with HCl. The 60 hypophysectomized Sprague-Dawley rats received either saline s.c. (30 controls) for 10 days or 25 μg GH s.c. for 10 days and were then tested along with 60 unoperated controls by infusion of HCl (0.1 N, 0.7 ml/min via a catheter) with sampling of blood and tissue prior to and at 5, 15, 30, and 60 min after infusion. The mean basal plasma secretin level was markedly lower in hypo-x rats (113 pg/ml) than in intact (134 pg/ml) or hypo-x plus GH rats (166 pg/ml). However, at 5 min, the hypo-x rats had markedly higher mean plasma secretin levels than did the intact or hypo-x plus GH rats (374, 251, and 285 pg/ml, resp.). All three groups showed a decrease in mean plasma secretin level after 60 min of irrigation with HCl (155, 176, and 181 pg/ml, resp.). Hypo-x rats had the highest mean basal secretin level in duodenal mucosal tissue (442 ng/g), whereas the intact and hypo-x plus GH rats had lower values that were similar to each other (229 and 242 ng/g, resp.). Continuous acid perfusion produced a stepwise depletion of mucosal secretin levels up to 30 min (100, 79, and 109 ng/g in hypo-x, intact, and hypo-x plus GH rats, resp.) with no further significant change by 60 min. The increased duodenal secretin stores may be responsible for the initial large secretin release in response to HCl seen in hypo-x rats. Because GH reverses these effects, the pituitary may play a role in the release and metabolism of secretin.

7441 IMMUNOHISTOCHEMICAL LOCALISATION OF UROGASTRONE TO HUMAN DUODENAL AND SUBMANDIBULAR GLANDS. (Eng.) Heitz, P. U.; Kasper, M.; Van Noorden, S.; Polak, J. M.; Gregory, H.; Pearse, A. G. E. (Dept. Pathology, Univ. Basel, Schonbeinstrasse 40, CH-4056 Basel, Switzerland). *Gut* 19(5):408-413; 1978.

To establish the precise localization of urogastrone in normal human tissues, immunostaining and improved cytochemical techniques were used on freeze-dried human tissue samples fixed in formaldehyde vapor. Fresh operative samples of tissue surrounding tumors of submandibular and parotid glands and kidney and operative and biopsy specimens from pancreas, corpus and antrum of stomach, duodenum, jejunum, ileum, and colon were examined. All tissues were normal by histological examination. The immunoreactive peptide gave positive granular immunostaining in the submandibular gland acini and the duodenal (Brunner's) gland acini and ducts. Cells of the duodenal glands had immunostaining localized to the supranuclear part of cytoplasm. Increased immunostaining was observed in the duct cells of duodenal glands with little or no staining of the duodenal crypt epithelium. The content of the ducts and part of the duodenal surface film also showed intense reaction. In the submandibular glands, the immunostain was confined to granules of some acinar cells. The duct cells did not show any reaction. Immunostaining observed in the pyloric glands was considered to be nonspecific. No immunostaining was seen in the other tissues tested. It is conceivable that urogastrone is a protective factor with a dual action: inhibition of gastric acid secretion and stimulation of cell proliferation or regeneration of the intestinal mucosa. Thus it may have both regulatory and protective functions and may be useful as a therapeutic agent.

7442 INTESTINAL MUCOSAL HYDROLYSIS OF PROTEINS AND PEPTIDES. (Eng.) Kim, Y. S. (Veteran Admin. Hosp., San Francisco, CA). *Ciba Found. Symp.* 50(New Series):151-176; 1977.

7443 INTESTINAL BRUSH BORDER PEPTIDASES. (Eng.) Noren, O.; Sjostrom, H.; Svensson, B.; Jeppesen, L.; Staun, M.; Josefsson, L. (Dept. Biochemistry C, Univ. Copenhagen, Copenhagen, Denmark). *Ciba Found. Symp.* 50(New Series):177-197: 1977.

7444 INTRACELLULAR HYDROLYSIS OF PEPTIDES. (Eng.) Josefsson, L.; Sjostrom, H.; Noren, O. (Dept. Biochemistry C, Univ. Copenhagen, Copenhagen, Denmark). *Ciba Found. Symp.* 50(New Series):199-207; 1977.

7445 INTESTINAL HYDROLYSIS OF DISACCHARIDES AND PEPTIDES: COMPARISON OF HYDROLASES AND PERFUSION STUDIES. (Eng.) Rhodes, J. B.; Arvanitakis, C.; Folscroft, J. (Univ. Kansas Medica

er, Kansas City, KS). *Ciba Found. Symp.* 50(New
es):245-263; 1977.

INTESTINAL DIPEPTIDASES AND DIPEPTIDE
TRANSPORT IN THE MONKEY AND IN MAN.
.) Radhakrishnan, A. N. (Sch. Life Sciences,
. Hyderabad, Hyderabad-500001, India). *Ciba*
d. Symp. 50(New Series):37-59; 1977.

A BRUSH-BORDER-BOUND PEPTIDASE AND AMINO
ACID TRANSPORT. (Eng.) Wacker, H.;
nza, G. (Laboratorium fur Biochemie der Eid-
ssischen Technischen Hochschule, Zurich,
zerland). *Ciba Found. Symp.* 50(New Series):
121; 1977.

7448 AN EXPERIMENTAL STUDY ON THE ARTIFICIAL INTESTINAL VALVE BY TELESCOPING ANASTOMOSIS. (Eng.) Zheng, H. L. (Kitano Hosp., 3-Nishiogimachi, Kita-ku, Osaka 530, Japan). *Arch. Jpn. Chir.* 46(6):657-679; 1977.

See also, 7272, 7276, 7285, 7296, 7311, 7312, 7313, 7320, 7321, 7449, 7452, 7454, 7459, 7463, 7467, 7477, 7656, 7657, 7721, 7940.

GENERAL

APOPTOSIS IN THE SMALL INTESTINE OF ZINC-
DEFICIENT AND FASTED RATS. (Eng.) Elmes,
. (Univ. Hosp. Wales, Heath Park, Cardiff CF4
Wales). *J. Pathol.* 123(4):219-224; 1977.

idy was carried out to determine whether apop-
bodies (membrane-bounded bodies formed by
condensation and fragmentation of the cell dur-
cell death) occur in the small intestine of
during zinc deficiency. Forty-two Wistar-
ved albino rats were divided into zinc-deficient
with <1 ppm zinc), pair-fed control (4 ppm
supplement in diet), and *ad libitum*-fed con-
(11 ppm Zn^{2+} in diet) groups for 4-6 weeks;
emale Wistar rats were divided into 5 groups:
sted and 24, 48, 72, or 96-hr fasted rats.
tron microscopy revealed a few apoptotic bodies
ved from scattered single cells in the control
intestines (averages of 1.6, 3.25, and 3.1
otic bodies/5-µm section in the duodenum,
num, and ileum, resp.). The zinc-deficient
als showed severe signs of zinc deprivation;
-fed controls were underweight but fit and *ad*
tum-fed controls were healthy. While all ani-
had apoptotic bodies, these were too numerous
ount in the zinc-deficient rats. The number of
bodies was greatest in the duodenum and je-
and least in the ileum, with wide variations
animals; the bodies were present mainly in
idzone of the crypts. The number of apoptotic
es in the jejunum and ileum of fasted rats in-
sed with the length of the fast and were nu-
s in both the midzone and fundus of crypts
72 hr of fasting. The results demonstrate
apoptotic bodies occur normally in small num-
in the rat intestine and are markedly in-
sed in number during zinc starvation and fast-
It is suggested that the failure of DNA syn-
s that may occur during both zinc starvation
asting may increase the rate of cell death
optosis.

7450 REARING REGIMEN PRODUCING PIGLET DIARRHEA (ROTAVIRUS) AND ITS RELEVANCE TO ACUTE INFANTILE DIARRHEA. (Eng.) Lecce, J. G.; King, M. W.; Dorsey, W. E. (Dept. Animal Science, North Carolina State Univ., Raleigh, NC 27607). *Science* 199 (4330):776-778; 1978.

To develop a successful regimen for weaning and rearing excess piglets (those a sow cannot adequately nurse in a large litter) adaptable to existing farm conditions, several experiments were carried out. When 93 piglets farrowed on a commercial farm were taken after 1 day of nursing and reared over 1.5 months in an isolated nursery with an automatic feeding device (Autosow) to 2 weeks of age, 70% experienced vomiting and diarrhea after 1 week; 43/93 were treated with 25 ml cow colostrum (3 times/day for 5 days) and 7% died; 50/93 were not treated and 29% died. Weight gains in the survivors were only 2.5 instead of 3-4 times their birth weights. When piglets farrowed in a sanitary environment and nursed for 1 day were placed in a fresh nursery with new groups introduced every 10 days (producing continuous, overlapping use of the nursery), about seven litters were reared without incident to the expected 2-week weight gain over a 5-week period. Then a mild, transient diarrhea lasting <1 day occurred in the older pigs. Between 5 and 7 weeks of nursery use, the diarrhea became more pronounced, of longer duration, and affected more piglets; sometimes initial vomiting occurred, but there was no dehydration and no death. Between 7 and 9 weeks, all entering piglets began vomiting at 3-5 days of age, they underwent dehydration, the death rate was ≥50%, and the surviving piglets gained only 2.5 times their birth weights. After 9 weeks, all piglets began vomiting 2-4 days after entry and were dead by 10 days of age. Bacteria-free infectious material containing large numbers of rotavirus (about 10^9/ml) was obtained from diarrheal fluid.

The experiment was repeated for six successive cycles of the same description (the cycles were sometimes shorter but always showed the pattern of increasing severity) with a complete cleaning, fumigation, and 1-week period of vacancy between cycles. There was no correlation between the number of airborne bacteria (always 500-1,000/m^3) and either the length of continuous use of the nursery or the initiation of diarrhea. Antibodies to pig rotavirus were found in all samples of pooled cows' colostrum tested. Eighty-eight percent of 150 sows in 14 herds had antibodies to pig rotavirus that could be passed to their 1-day-old piglets via colostrum. It is concluded that, in the natural situation, the high prevalence of rotavirus assures that the neonate will first encounter it while passively protected by colostral antibodies and that an active immunity will issue from constant exposure without the burden of overt disease. However, the nursery contains susceptible piglets (those >1 day old and without colostral antibody) capable of amplifying the infection; with continuous use, an infection of increasing severity passes from young to young. Cleaning the delivery room to lower the initial viral dose, cleaning the nursery between groups to prevent amplification, and using p.o. antibody therapy can prevent the disease.

7451 A SIMPLE ENZYMATIC METHOD FOR ISOLATION OF HEPATOCYTES. (Eng.) Igarashi, S. (Tokyo Hosp., Japan Monopoly Corporation, 1-4-3 Mita, Minato-ku, Tokyo, Japan). *Experientia* 33 (10):1401-1402; 1977.

A new technique for the isolation of hepatocytes was developed. Liver was removed aseptically as a whole from Wistar rats, washed with physiological saline, injected (10 ml/min) with 20 ml of 0.05% bacterial collaginase in Ca-free Hank's solution (that was warmed in advance to 37 C) at one or more sites to produce a diffuse whitish color change of the whole liver, washed once in Ca-free Hank's solution, and then torn into small pieces with forceps in a dish containing 10-20 ml of the solution. Hepatocytes were liberated during this procedure. The tissue- and cell-containing solution was filtered through a 150-mesh platinum sieve and centrifuged at 200 rpm for 3 min. The sediment was suspended in 10 ml of Eagle's minimum essential medium (MEM) and centrifuged again for two cycles of purification to remove RBC. The recovery of hepatocytes was >90% of the amount of the initially isolated cells (average of 10 experiments was 7.86 ± 4.24 x 10^6 cells/g wet tissue). The contamination by mesenchymal cells was <1%. More than 95% of the isolated hepatocytes excluded trypan blue. The rate of glucose production from 2 μmol of alanine or lactate was 7.76 and 8.67 nmol/hr/10^6 cells for alanine and 16.33 and 10.87 nmol/hr/10^6 cells for lactate in two separate experiments. The new technique is simple, reduces the preparation time to 1/2-1/3 compared with hepatic perfusion methods, and lowers the risk of bacterial or fungal contamination during isolation.

7452 EXTREME SENSITIVITY OF SOME INTESTINAL CRYPT CELLS TO X AND γ IRRADIATION. (Eng Potten, C. S. (Christie Hosp., Manchester, England) *Nature* 269(5628):518-521; 1977.

7453 VASCULAR CHRONIC-FIBROSING PANCREATITIS OF THE RAT AFTER 5/6-NEPHRECTOMY. (Eng.) Putzke, H. P.; Jonas, L.; Bienengraber, A. (Inst. General and Systemic Pathology, Wilhelm Pieck Univ. Rostock, Strempelstrasse 14, DDR-25 Rostock, E. Germany). *Exp. Pathol. (Jena)* 14(314):113-121; 1977.

7454 BLOOD FLOW AND OXYGEN CONSUMPTION IN THE FELINE SMALL INTESTINE: RESPONSES TO ARTIFICIAL DISTENSION AND INTESTINAL OBSTRUCTION. (Eng.) Ohman, U. (Karolinska Sjukhuset, Stockholm, Sweden). *Acta Chir. Scand.* 142(4):329-333; 1976.

7455 INTESTINAL PARASITOSIS OF RHESUS MONKEYS (Macaca mulatta) IN HEALTH AND DISEASE. (Eng.) Jindal, B. R.; Vinayak, V. K.; Chhuttani, P. N. (Postgraduate Inst. Medical Education and Res Chandigarh, India). *Bull. Postgrad. Inst. Med. Educ. Res. Chandigarh* 11(3):110-113; 1977.

7456 PRODUCTION AND EVALUATION OF SECRETIN ANTIBODIES. (Eng.) Burhol, P. G.; Waldum, H. L. (9012 Univ. Hosp., Tromsoe, Norway). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):139-143; 1978.

7457 DYNAMICS OF THE INTERACTION BETWEEN Entamoeba histolytica AND COMPONENTS OF THE IMMUNE RESPONSE. I. CAPPING AND ENDOCYTOS INFLUENCE OF INHIBITING AND ACCELERATING FACTORS; VARIATION OF THE EXPRESSION OF SURFACE ANTIGENS. (Eng.) Aust-Kettis, A.; Sundqvist, K. G. (Natl. Bacteriological Lab., S-105 21 Stockholm, Sweden). *Scand. J. Immunol.* 7(1):35-44; 1978.

7458 THE INHIBITORY EFFECT OF HEPARIN ON TRYP SINOGEN ACTIVATION WITH ENTEROKINASE. (Eng.) Wolosowicz, N.; Prokopowicz, J.; Gabryelewicz, A. (Medical Sch., 15-276 Bialystok, Poland) *Acta Hepatogastroenterol. (Stuttg.)* 24(5):368-371 1977.

7459 DIETARY, BACTERIAL, AND HOST GENETIC IN ACTIONS IN THE PATHOGENESIS OF TRANSMIS SIBLE MURINE COLONIC HYPERPLASIA. (Eng.) Bartho S. W.; Osbaldiston, G. W.; Jonas, A. M. (Yale Uni Sch. Medicine, New Haven, CT 06510). *Lab. Anim. Sci.* 27(6):938-945; 1977.

7460 SCHISTOSOMIASIS MANSONI IN THE HAMSTER: CELLULAR AND HUMORAL IMMUNE RESPONSES T SOLUBLE EGG ANTIGENS (SEA). (Eng.) Oberlin, U. Weiss, N. (Swiss Tropical Inst., Basel, Switzerla *Am. J. Trop. Med. Hyg.* 26(6, Part 1):1178-1182; 1

61 IMMUNITY TO THE METACESTODE OF Taenia
taeniaeformis IN THE LABORATORY RAT.
ng.) Lied, R. W. (Veterinary Clinical Center,
chigan State Univ., East Lansing, MI 48824).
J. Trop. Med. Hyg. 26(6, Part 2):54-60; 1977.

52 REJECTION OF WORM LOAD THROUGH SINGLY AND
REPEATEDLY SENSITIZED PERITONEAL EXUDATE
LS DURING EXPERIMENTAL ANCYLOSTOMIASIS. (Eng.)
rdhani, V.; Johri, G. N. (Sch. Studies in Zoology,
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53 INNERVATION OF THE DUODENAL SUBMUCOSAL
BRUNNER'S GLANDS. (Eng.) Kyosola, K.
pt. Anatomy, Univ. Helsinki, Helsinki, Fin-
d). *Acta Physiol. Scand.* 101(4):498-500; 1977.

4 CELLULAR CHANGES IN THE INTESTINAL LYMPH
OF SHEEP INFECTED WITH THE ENTERIC NEMA-
E, Trichostrongylus colubriformis. (Eng.)
ms, D. B.; Cripps, A. W. (C.S.I.R.O. Div.
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5 ORAL IMMUNIZATION OF MONKEYS WITH POLY-
VALENT DYSENTERY VACCINE. (Eng.)
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ences, P.O.B. 66, Gora Trapetziya, Sukhumi,
R). *Acta Microbiol. Acad. Sci. Hung.* 24(1):
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6 AN EXPERIMENTAL STUDY ON ENDOSCOPIC PAPIL-
LOTOMY IN MONKEYS. (Eng.) Tanaka, M.;
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amoto, T. (Kyushu Univ., Faculty Medicine, 3-1-1
dashi, Fukuoka 812, Japan). *Endoscopy* 9(3):140-
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7 DETECTION OF INTESTINAL ISCHEMIA: PART 2.
TEMPERATURE DIFFERENCE BETWEEN MESENTERIC
ANTIMESENTERIC MARGIN OF BOWEL AS A CRITERION
INTESTINAL ANASTOMOSIS VIABILITY. (Eng.)
nick, S.; Solowiejczyk, M.; Grosman, E. (Veterans
in. Hosp., Brooklyn, NY 11209). *Rev. Surg.* 34
371-375; 1977.

7468 GASTROINTESTINAL BLOOD LOSS IN MAN DURING ADMINISTRATION OF TWO AMPICILLIN ESTERS. (Eng.) Magnusson, B.; Solvell, L.; Wessman, J. (Salgren's Hosp., S-413 45 Goteborg, Sweden). *Scand. J. Infect. Dis.* 9(3):218-220; 1977.

7469 COLITIS CYSTICA SUPERFICIALIS: A REPORT OF A CASE IN A BARBARY APE (Macaca sylvana). (Eng.) Scott, G. B. D. (Royal Free Hosp. Sch. Medicine, London NW3, England). *J. Pathol.* 124(1):23-25; 1978.

7470 HEALING OF THE OESOPHAGUS AFTER TOTAL LIGATION WITH THE BOEREMA BUTTON AND A SIMILAR APPARATUS ACTING WITH MAGNETIC FORCE: AN EXPERIMENTAL STUDY. (Eng.) Koomen, A. R.; Klopper, P. J. (St. Elisabeth of Groote Gasthuis, Haarlem, Netherlands). *Arch. Chir. Neerl.* 29(4): 217-228; 1977.

7471 TRANSPLANTATION OF THE SMALL INTESTINE: AN EXPERIMENTAL STUDY IN YOUNG MINIPIGS. (Eng.) Stauffer, U. G.; Becker, M.; Mona, D.; Kara, O. (Universitats-Kinderklinik Zurich, Steinweisstrasse 75, CH-8032 Zurich, Switzerland). *Res. Exp. Med.* 172(2):161-171; 1978.

7472 BLOOD FLOW IN INTESTINAL ABSORPTION MODELS. (Eng.) Winne, D. (Pharmakologisches Institut der Universitat Tubingen, D-7400 Tubingen, W. Germany). *J. Pharmacokinet. Biopharm.* 6(1):55-78; 1978.

See also, 7271, 7325, 7430, 7922, 7936.

DIAGNOSTIC PROCEDURES

7473 TRANSMUCOSAL POTENTIAL DIFFERENCE; DIAGNOSTIC VALUE IN GASTRO-OESOPHAGEAL REFLUX.

(Eng.) Khamis, B.; Kennedy, C.; Finucane, J.; Doyle, J. S. (Royal Coll. Surgeons in Ireland, St. Laurence's Hosp., Dublin 7, Ireland). *Gut* 19(5): 396-398; 1978.

Transmucosal potential difference (PD) was determined in 19 patients with symptoms of upper gastrointestinal disease, and the values were correlated with the histological appearance of mucosal biopsy specimens taken from the area of contact with the exploring electrode. PD in the lower esophagus was recorded at endoscopy, and suction biopsy specimens were obtained from the site of measurement and examined by light microscopy after hematoxylin and eosin staining. In 10 patients with normal histology, mean PD was -14.4 ± 0.4 mV, whereas in the 9 patients with histological changes of reflux, the mean was +9.4 ± 3.0 mV. In this latter group, polarity of the PD was reversed in all but one case. Good correlation ($p<0.001$) was found between these objective indices of lower esophageal disease and the presence of symptoms such as dysphagia and heartburn. The visual appearance at endoscopy was less reliable. It is suggested that measurement of PD is a simple, rapid, and sensitive method of detecting the presence of esophageal mucosal damage.

7474 ENDOSCOPIC TOLUIDINE BLUE SCATTERING METHOD IN THE DIAGNOSIS OF GASTRIC LESIONS.

(Eng.) Beker, S.; Eslava, F.; Zerpa, H.; Castillo, R.; Carballo, F.; Roa, E.; *et al.* (Apartado Postal 50794, Caracas, Venezuela). *Gastrointest. Endosc.* 24(2):72-73; 1977.

The efficacy of the direct application of toluidine blue to the gastric mucosa under immediate endoscopic observation in the diagnosis of gastric lesions was studied in 18 patients with normal stomach mucosae and 100 patients with gastric disease. The intensity of toluidine blue staining was graded from 0 (nonstained) to 4+ (deep royal blue staining). In 45 cases of gastritis without intestinal metaplasia, staining in the damaged mucosa was rated 1+ to 2+. In 16 cases of gastritis with intestinal metaplasia, toluidine blue stained between 2+ and 3+. In 17 gastric ulcers, staining was dark (3+ to 4+) at the base of the craters, but this was of no diagnostic value due to the presence of fibrin and to the healing process. The staining method was of value only when the dye appeared at the margins, where staining varied from 1+ to 2+; biopsy showed superficial gastritis and intestinal metaplasia. In 10 cases of scar formed after ulcer healing, 9 stained between 1+ and 2+, corresponding to the degree of gastritis. Of 12 patients with protuberant lesions, 6 were classified endoscopically as having benign polyps. In two polyps, with depressed centers, staining was 2+. In the other six protuberant lesions, endoscopically suspected as malignant, toluidine blue stained 4+, and the histologic diagnosis in all cases was adenocarcinoma. These results indicate that the endoscopic toluidine blue scattering method enhances the delineation of intestinal metaplasia and aids in the differential diagnosis of benign and malignant gastric ulceration.

7475 THE INFUSION SMALL-BOWEL STUDY. (Eng.)

Loewig, K. R.; Sanders, D. E.; Ho, C. S. (Toronto General Hosp., Toronto, Canada). *Appl. Radiol.* 6(6):100-101, 104, 151-152; 1977.

The value of intubation with rapid (80-100 ml/min) barium infusion into the fourth part of the duodenum was evaluated in roentgenology of 600 patients; five case reports are given briefly. Direct infusion has four major advantages over the conventional method that contribute to improved definition of morphology: (1) full distention to elucidate contour defects and distensibility, (2) double-contrast demonstration for intraluminal defects, (3) hypotonia for improved definition, and (4) fluoroscopy of the entire small bowel. The technique's use in diagnosing Crohn's disease, stenosis and ulceration that proved to be an area of ischemic enteritis, possible tuberculosis, and possible *Yersinia enterocolitica* infection is illustrated. The technique improves the threshold for recognition of subtle lesions and provides better detail for identification of specific disease processes.

7476 RADIONUCLIDE DIAGNOSIS OF BLEEDING MECK DIVERTICULUM IN CHILDREN.

(Eng.) Schu heim, A.; Moskowitz, G. W.; Levy, L. M. (Long Island Jewish-Hillside Medical Center, New Hyde Park, NY 11040). *Am. J. Gastroenterol.* 68(1):25-29; 1977.

The technique and results of ^{99m}Tc-pertechnetate scanning and computer analysis in 70 children with a suspected diagnosis of Meckel's diverticulum are presented. The patient is placed under the detector head of the scintillation camera so that some part of the stomach and the bladder is seen in the field of view. The videotape unit of the camera is starte just prior to the injection of the sodium pertech netate (0.15 mCi/kg, i.v.). The subsequent radio isotope distribution is visually monitored on the variable persistence oscilloscope and quantitativ recorded in digital mode for 60-90 min. Successi 4-min exposures are made at the exposure intensit that shows the general background activity as a slight haze, assuring that activities greater tha background are visible. At 45 min after the injection, the patient voids so that ectopic foci might not be obscured by the accumulating radioactivity of the bladder contents. Meckel's diverticulum usually visualizes early and generally simultaneously with gastric mucosa. A positive Meckel's diverticulum examination is the observation of a discrete localized collection of radioactive material separate from the stomach and bladder appearing generally in the right lower quadrant. When the results are equivocal, data manipulation on the Prime 300 general purpose minicomputer helps to differentiate Meckel's diverticulum from nonspecific collections of rad

vity. Five scans were positive in this ser-
and all were verified at surgery. None of the
ents with negative scans have been subsequently
d to have a diverticulum. The authors believe
this method is a safe procedure that should
onsidered a primary diagnostic modality in the
stigation of children with suspected bleeding
el's diverticulum.

EVALUATION OF ISCHEMIC BOWEL VIABILITY WITH A FLUORESCENT TECHNIQUE. (Eng.)

ar, C. J. H.; Randolph, J. G. (Abraham Lincoln
Medicine, 840 South Wood St., Chicago, IL
2). *J. Pediatr. Surg.* 13(3):221-225; 1978.

dy was carried out to develop objective cri-
for evaluation of small bowel viability fol-
g ischemia. The fluorescent pattern of is-
c rabbit intestine after the i.v. injection of
m fluorescein was correlated with a clinical
ation of intestinal viability in 45 female
ealand rabbits in which a 10-cm segment of
l ileum 15 cm proximal to the ileocecal valve
ubjected to ischemia for periods of 4-12 hr.
15 min of warming the ischemic segment, a
cal estimation of viability was made, 1 cm^3 of
dium fluorescein was injected, and the segment
graphed; a second-look operation was carried
4 hr later. All animals were supported with
mycin (3 mg/kg/day) and clindamycin (15 mg/kg/
begun preoperatively and continued for 10 days,
in (20 g/day, i.v.) until death or recovery,
ethasone (1 mg/kg, one dose), sodium bicar-
e, and Ringer's solution. All ischemic seg-
were studied grossly and histologically at
sy following death or sacrifice (at 6 weeks).
schemic segments (4-7 hr of ischemia) exhibited
mal pattern of fluorescence (bright green,
h, and evenly distributed in capillary beds)
f histology (exuberant mucosal villi and rela-
y thin serosa); all were predicted to survive
inical criteria, and all did. Three patterns
normal fluorescence were seen. Type I was
cterized by a diffuse reticular distribution
uorescence, indicating a diminished blood
y in the small vessels, and by interstitial
and mucosal loss, all of which reversed nearly
etely over the 6 weeks. Twelve segments (is-
c for 5-10 hr) showed this pattern; 7/12 were
cted to survive but 12/12 actually survived.
II was characterized by uneven dye distribu-
with large patchy areas of nonfluorescence,
he dye had disappeared completely 24 hr after
tion. Twenty-three segments (ischemic for 7-
) showed this pattern and fell into two groups.
A (15/23) showed interstitial edema, mucosal
hemorrhage, granulation tissue, and scarring;
was predicted to survive; 10/15 actually sur-
. Group B retained the initial dye, which
een after 24 hr in large confluent patches; a
t dye injection extravasated into the inter-
al spaces of the intestinal wall. Histo-
ally, there was complete autolysis. This group
eclassified as type III; all eight were not
cted to survive; all died. The fluorescent
d is much more reliable than conventional clinical predictors or survival following intestinal ischemia; the second-look procedure is a valuable part of the technique.

7478 THE USE OF GLUCAGON IN THE DIAGNOSIS AND MANAGEMENT OF ILEOCOLIC INTUSSUSCEPTION.

(Eng.) Hoy, G. R.; Dunbar, D.; Boles, E. T., Jr. (Ohio State Univ. Coll. Medicine, Columbus, OH). *J. Pediatr. Surg.* 12(6):939-944; 1977.

Experience with barium enema supplemented by glucagon in the diagnosis and treatment of 44 pediatric patients with suspected ileocolic intussusception is presented. Glucagon was given 5-20 min prior to the examination in a dose of 0.05 mg/kg either i.m. or i.v. Reduction of intussusception by the barium enema hydrostatic technique was accomplished in 21 of the 25 cases of intussusception. In 15 of the 21 patients, successful reduction was achieved on the first examination; in the other 6, it was achieved on the second examination. The second examinations were necessary because of mechanical problems in the apparatus or the catheter. Free reflux of barium into the terminal ileum was readily obtained in all these patients. The effect of glucagon on the comfort of the patient was assessed in 39 patients. Nineteen were completely cooperative and comfortable during the examination. Fourteen had some discomfort and were less cooperative, but the examination was not compromised. Only six patients were very uncomfortable and uncooperative. No serious complications or adverse reactions occurred in any patient. The use of glucagon in barium enema examinations seems to enhance the comfort of the patient and the ease of colon and small bowel filling.

7479 THE USE OF PRONE FILMS FOR SUSPECTED BOWEL OBSTRUCTION IN INFANTS AND CHILDREN.

(Eng.) Lorenzo, R. L.; Harolds, J. A. (Medical Univ. South Carolina, 80 Barre St., Charleston, SC 29401). *Am. J. Roentgenol.* 129(4):617-622; 1977.

The value of prone films of the abdomen, both frontal and cross-table lateral, in the differentiation of obstructive versus nonobstructive ileus is illustrated by six case reports of infants and children. In two cases, supine and upright films showed evidence of obstruction; however, prone and cross-table lateral films in the first case and prone films in the second demonstrated a normal amount of air in the rectum and excluded intestinal obstruction. In three other patients, in whom the supine and upright films showed distended bowel loops and air-fluid levels, the prone and/or cross-table lateral films showed no air in the rectum, thus suggesting obstruction. Meconium ileus, stricture secondary to necrotizing enterocolitis, and ileus secondary to a left inguinal hernia were subsequently diagnosed in these patients. In the remaining patient, the plain supine and upright views demonstrated distended bowel loops and air-fluid levels. A prone film showed air in a rectum of abnormal caliber, and a plain film diagnosis of low segment aganglionic megacolon was made. Barium enema and the findings at surgery confirmed this diagnosis. These observations show that prone and lateral decubitus films are useful in evaluating the gas in the large bowel, particularly in the rectum. The level of obstruction, as well as differentiation between obstructive and nonobstructive ileus, can be determined by this plain-film approach.

7480 PANCREATIC ENZYMES IN HUMAN DUODENAL JUICE--A COMPARISON OF RESPONSES IN SECRETIN PANCREOZYMIN AND LUNDH BORGSTROM TESTS.

(Eng.) Braganza, J. M.; Herman, K.; Hine, P.; Kay, G.; Sandle, G. I. (Manchester Royal Infirmary, Manchester, England). *Gut* 19(5):358-366; 1978.

The concentrations and total outputs of trypsin, amylase, and lipase secreted into the duodenum during secretin pancreozymin and Lundh Borgstrom tests were assessed in 12 patients without pancreatic disease and 3 normal subjects to assess the relative intensity of pancreatic stimulation provided by these means. The mean concentration of trypsin and the mean 10-min total output of trypsin, amylase, and lipase after the meal (though less than the peak postprandial responses) were equal to the respective peak enzyme responses after the i.v. injection of 2 Crick Harper Raper U/kg of secretin Boots and after the i.v. injection of 2 Crick Harper Raper U/kg of pancreozymin Boots.

7481 THE USE OF PROSTAGLANDIN F2-ALPHA IN SELECTIVE PANCREATIC AND LEFT GASTRIC ANGIOGRAPHY.

(Eng.) Legge, D. (Mater Misericordiae Hosp., Dublin, Ireland). *Clin. Radiol.* 29(3):285-288; 1978.

Prostaglandin F_2-alpha was used in 10 superselective angiographic studies of the pancreas for suspected carcinoma and 10 left gastric studies for suspected portal hypertension to improve anatomic detail and diagnostic accuracy. The injection of prostaglandin (60 μg) into the dorsal pancreatic or gastroduodenal artery increased opacification of small pancreatic vessels and better demonstrated the angiographic changes in all three patients who were found to have carcinoma of the pancreas. Injection of the drug into the left gastric artery increased opacification of the left gastric vein, allowed identification of the direction of flow of the contrast medium, and enhanced demonstration of gastroesophageal varices in the five patients in whom these were present. It is concluded that prostaglandin improves the quality of pancreatic and left gastric angiographic studies.

7482 ENDOSCOPIC ASPIRATION BIOPSY OF THE PANCREAS.

(Eng.) Tsuchiya, R.; Henmi, T.; Kondo, N.; Akashi, M.; Harada, N. (Nagasaki Univ. Sch. Medicine 7-1, Sakamoto-Machi, Nagasaki City, Nagasaki, Japan). *Gastroenterology* 73(5):1050-1052; 1977.

The diagnostic accuracy of endoscopic aspiration biopsy in malignancies of the periampullary region and the pancreas was assessed retrospectively in 51 patients. Biopsy is carried out with a side-viewing duodenal or gastric fiberscope and a newly designed biopsy needle. The needle consists of a guide tube and an inner tube made of Teflon. The guide tube for the gastrofiberscope is 1,542 mm long, and that for the duodenofiberscope is 1,790 mm. A 7-mm long 23-gauge metal needle is used for the gastrofiberscope, and a 6-mm long 26-gauge needle for the duodenofiberscope. Malignant cells were identified in 21 of 25 patients with carcinoma, making the overall diagnostic accuracy 84.0%. Malignant cells were diagnosed in 8 of 10 patients with pancreatic malignancy who underwent transduodenal aspiration biopsy, but not gastric biopsy. The false-negative diagnoses were made in patients with carcinoma of the body and tail of the pancreas. Malignancy was diagnosed in 10 of the 11 patients with cancer who underwent transgastric aspiration biopsy alone. In the patient in whom the correct diagnosis was missed, well-differentiated adenocarcinoma cells were thought to be benign atypical cells. Pancreatic carcinoma was correctly diagnosed in all four patients who underwent both gastric and duodenal biopsy. There were no false-positive diagnoses, and no complications attributed to the procedure were encountered. Endoscopic aspiration biopsy is valuable in the diagnosis of pancreatic carcinoma.

7483 CYSTIC FIBROSIS SCREENING IN THE NEWBORN

(Eng.) Crossley, J. R.; Berryman, C. C. Elliott, R. B. (Sch. Medicine, Univ. Auckland, 85 Park Rd., Auckland 3, New Zealand). *Lancet* 2(8048 1093-1095; 1977.

An improved colorimetric method for trypsin assay in stool samples as a test for cystic fibrosis in newborns is described, and the results of the method in consecutive neonates are reported. A colorless substrate, benzoyl-arginine-*p*-nitroanilide (BAPNA), releases yellow *p*-nitroaniline when hydrolyzed by trypsin. Stool samples from infant with cystic fibrosis, who lack trypsin, give negligible color. Among 4,500 newborns screened by this method, 2 were found to have cystic fibrosis. The method was also tested in five other untreate children known to have the disease, and the solutions had no yellow tint whatever. In 2,500 consecutive samples in which D,L-BAPNA was used as substrate, the frequency of positive results afte a single assay was 3.2%. Reassay of these sample gave a second specimen-request rate of 30/2,500. When the second specimens were assayed, 27 gave normal results, but 3 showed low enzyme activity. By quantitative assay of a stool specimen, one of these babies was shown to have normal enzyme activity, but that the other two had no enzyme activity. The diagnosis of cystic fibrosi was confirmed by a sweat test. When 13 consecutive specimens that had twice given false-positiv results (no color) with D,L-BAPNA (0.5 mg/test) were assayed with L-BAPNA (0.25 mg and 0.5 mg/tes 11 of 13 and 12 of 13, resp., gave normal results The authors are now screening with 0.25 mg L-BAPN test and reassaying with 0.25 mg and 0.5 mg/test; the frequency of positive results is now 0.4% aft

ne assay, reducing to 0.1% after reassay of the
ame specimen (2,000 samples). There has been no
vidence of false-negative results.

84 PANCREATIC INJURY FOLLOWING ERCP: FAILURE OF PROPHYLACTIC BENEFIT OF TRASYLOL.

Eng.) Brust, R.; Thomson, A. B. R.; Wensel, R. H.;
nerbaniuk, R. W.; Costopoulos, L. (Univ. Alberta
osp., Edmonton, Alberta, Canada). *Gastrointest.
ndosc.* 24(2):77-79; 1977.

ne value of Trasylol in the prevention of pancrea-
itis following endoscopic retrograde cholangio-
ancreatography (ERCP) was tested in 61 patients
n a double-blind randomized study. Postprocedural
yperamylasemia occurred in 66% of cases within 2
r, and in 57% the elevations in amylase persisted
or 24 hr after the procedure. Elevated urinary
mylase levels were found in 34% of patients. Symp-
oms attributable to the procedure occurred in 39%.
ne frequency of clinical and biochemical changes
as unrelated to the duration of the procedure (10
in-3 hr), the number of ducts cannulated, or ab-
ormalities in the ducts. The administration of
rasylol (200,000 U, i.v.) 2 hr before and 6, 12,
8, and 24 hr following ERCP failed to prevent or
ignificantly reduce the frequency or magnitude of
levations in serum or urine amylase activity or
o prevent postexamination abdominal pain.

85 THE USE OF PROSTAGLANDIN E_1 FOR ENHANCED VISUALIZATION OF THE SPLANCHNIC CIRCULA-

ON. (Eng.) Jonsson, K.; Wallace, S.; Jacobson,
D.; Anderson, J. H.; Zornoza, J.; Granmayeh, M.
. D. Anderson Hosp. Tumor Inst., Houston, TX
030). *Radiology* 125(2):373-378; 1977.

inical experience with prostaglandin E_1 (PGE_1)
an aid in enhancing portal vein visualization
d its use in angiography of the liver and pan-
eas are reported. When a single bolus injection
PGE_1 (5-7.5 µg except for 2.5 µg in a 5-yr-old
ild) was given into the superior mesenteric ar-
ry (SMA), hepatic artery (HA), or dorsal pan-
eatic artery (DPA) in 22 patients, the normal
jection rates for contrast medium were increased
mewhat, but the pain and sensation of heat ac-
mpanying this injection were identical to the
se without PGE_1. PGE_1 injection itself did not
oduce discomfort or significant pulse rate or
terial blood pressure changes in the patients.
E_1 injection dilated the arteries slightly and
rkedly increased blood flow; less reflux of
ntrast medium into adjacent arteries was noted.
e quality of portal vein opacification was greatly
proved in all patients in whom the comparison
s made: initial and optimal opacification oc-
rred at a mean of 5 and 10 sec, resp., with PGE_1
d 13 and 19 sec, resp., without PGE_1. The in-
eased injection rate (14 ml/sec for 3 sec) gave
ditional information in one hepatic angiogram
which a hypervascular metastatic lesion was
monstrated. In another patient, the injection of
E_1 and contrast medium (6 ml/sec for 5 sec) into
e DPA demonstrated a tumor in the tail of the
ncreas as a filling defect. In seven patients,
the parenchymal staining of the liver after SMA injection of PGE_1 and contrast medium showed filling defects corresponding to metastases or primary tumor in the liver. The use of PGE_1 markedly improves venous filling in splanchnic angiography.

7486 RESULTS OF TRANSJUGULAR ANTEGRADE CHOLANGIOGRAPHY AND RETROGRADE PORTOGRAPHY.

(Ger.) Thelen, M.; Paquet, K. J.; Schulz, D.; Herpertz, C. (Radiologische Klinik, Universitat Bonn, Bonn, W. Germany). *Roentgenblaetter* 30(10):508-519; 1977.

Transjugular antegrade cholangiography, liver biopsy, and retrograde portography are described. Transjugular cholangiography is indicated in intrahepatic or extrahepatic flow obstruction if i.v. or infusion cholangiography or endoscopic retrograde cholangiography are unsuccessful or unfeasible. Transjugular cholangiography was performed in 19 patients; it was successful in 16: stricture of a hepatojejunostomy was diagnosed in 5 cases, stricture of bile duct in 2, carcinoma of the common or hepatic bile ducts in 4, and iatrogenic stricture of the hepatic duct, stricture of the papilla, liver cirrhosis, chronic pancreatitis with stricture of the common bile duct, and compression of the hepatic duct by lymph node in 1 case each. Complication (injection under the hepatic capsule) occurred in one case only. Transjugular liver biopsy is indicated if transcutaneous biopsy or laparoscopy are unfeasible, and it is contraindicated (as is transjugular cholangiography) in hepatic echinococcosis, large liver abscess, and acute cholangitis. It was performed in 17 patients, and it was successful in 15. Hepatitis was diagnosed in two cases, liver carcinoma in one, liver fibrosis in six, liver cirrhosis in three, and cholestasis in three. Transjugular retrograde portography was performed in 41 patients with the clinical picture of liver fibrosis (4 cases), liver cirrhosis (25 cases), and intrahepatic space-occupying process (12). Liver cirrhosis with portal hypertension was diagnosed by transjugular portography in 29 cases, liver fibrosis in 4, echinococcosis in 3, and liver carcinoma in 5.

7487 PERITONEOSCOPY FOR THE DIAGNOSIS OF LEFT LOBE LESIONS OF THE LIVER.

(Eng.) Whitcomb, F. F., Jr.; Gibb, S. P.; Boyce, H. W., Jr. (Lahey Clinic Foundation, 605 Commonwealth Ave., Boston, MA 02215). *Arch. Intern. Med.* 138(1): 126-127; 1978.

The effectiveness of peritoneoscopy and direct vision liver biopsy were evaluated in 38 selected patients with focal lesions that had been detected by liver scan and were located predominantly in the left lobe or in the left portion of the right lobe where percutaneous blind biopsy was negative or nondiagnostic. ^{99m}Tc-sulfur colloid scans were performed because of hepatomegaly or abnormal liver function test results or both. Peritoneoscopy was successful in establishing the diagnosis in 36 of the 38 patients. The failures were due to uncooperativeness in one case and to adhesions from a previous operation that obscured the visibility in the other. Of the 36 patients, 30 had metastases that were clearly visible, 2 had Hodgkin's disease, 2 had thin left lobes, and 1 each had postnecrotic cirrhosis and polycystic disease. Two major complications were encountered: one patient had a decrease of hematocrit and required two transfusions although excessive bleeding had not been apparent immediately after the biopsy and another patient with Hodgkin's disease had postoperative fever and ileus (believed to be secondary to localized perforation of the bowel and peritonitis) that responded to antibiotics and i.v. fluids. Peritoneoscopy and direct vision liver biopsy are simple, safe, and accurate methods for the documentation of focal lesions involving predominantly the left lobe or the left portion of the right lobe of the liver.

7488 IMPROVEMENT IN VISUALIZATION OF HEPATIC LESIONS WITH UPRIGHT VIEWS. (Eng.) Mettler, F. A.; Shea, W. H., Jr.; Guiberteau, M. J.; Potsaid, M. S. (Cancer Res. Treatment Center, Univ. New Mexico, Albuquerque, NM 87131). *J. Nucl. Med.* 18(11):1128-1130; 1977.

To improve radiocolloid images of the liver by reducing the liver respiratory excursions, standing scintiphoto views of the liver were compared with conventional supine scans by a computer technique that was used to analyze and display the results. Patients and healthy volunteers were given 4 mCi of ^{99m}Tc sulfur colloid and scanned in both positions. In one patient with known hepatic metastases from lymphoma, the standard supine anteroposterior (AP) views alone would have resulted in a normal interpretation of the radionuclide scan, whereas the upright AP views were diagnostic (both views were considered along with gray-scale sonograms taken in each position the same day). Computer analysis of radiocolloid activity in the horizontal and vertical axes centered on a particular defect in a patient with known hepatic metastases from colon carcinoma demonstrated that the standing view gave better delineation of the lesion than did the supine view. Computer analysis of end-inspiration and end-expiration scans performed on normal volunteers showed that respiratory motion of the liver is approximately equal (2 cm) in the supine, prone, and sitting positions but is markedly decreased (0.5 cm) in the standing position. The standing position should be employed whenever maximal sensitivity for small focal defects is desired.

7489 EVALUATION OF BILIARY TRACT DISEASE BY DIAGNOSTIC ULTRASOUND. (Eng.) Lawson, T. L. (George Washington Univ. Medical Center, 901 23 St., NW, Washington, DC 20037). *Am. J. Dig. Dis.* 22(9):820-828; 1977.

The diagnosis of cholelithiasis and of biliary obstruction using ultrasound is reviewed. Gallstones produce three basic ultrasonographic appearances: focal, linear, or diffuse internal echoes; gallbladder wall contour irregularities of increased sonic density; and sonic shadowing. Focal inter
echoes are usually caused by large gallstones
(>0.5-1 cm diameter). Smaller, multiple gall-
stones may layer and float in the bile, giving a
linear area of sonic density with the gallbladde
If aggregates of small gallstones sink to the de
pendent wall of the gallbladder, they are seen a
an area of gallbladder wall irregularity of in-
creased sonic density. Sonic shadows are not se
in every case of cholelithiasis, but when shadow
ing occurs in conjunction with internal echoes o
contour irregularities, diagnostic confidence is
increased. Sonic shadowing from stones is usual
focal when seen in both longitudinal (sagittal)
and transverse scans; this shadowing can be dis-
tinguished from that produced by gas or barium
within the hepatic flexure, because the latter
usually more diffuse. Cholecystosonography is
reliable, with an overall accuracy of approximat
90%, a low composite false-positive rate of abou
1 or 2%, and a false-negative rate of approximat
5-10%. Dilated bile ducts can be visualized by
ultrasonography and usually appear as reticular
branching sonolucencies within the liver parench
Dilated bile ducts can be differentiated from he
patic veins, because hepatic veins become less
prominent in the periphery and most prominent as
they enter the vena cava in the region of the r
atrium. When dilated bile ducts are seen, the
diagnosis of extrahepatic biliary obstruction ca
be made with the exception of the unusual cir-
cumstance where there has been previous biliary
disease and persistent postoperative dilation.
Gallbladder diameter is not a good or reliable
sign of extrahepatic biliary obstruction becaus
of the great variabilities of gallbladder diame
in both diseased and normal conditions. Nevert
less, in the proper clinical setting, a gallbla
diameter of 4 cm or greater usually indicates p
ologic gallbladder dilation and biliary obstruc

7490 PANCREATIC SCANNING USING RETROGRADE
INJECTION OF TECHNETIUM-99m-LABELED
COMPOUNDS. (Eng.) Varley, P. F.; Silvis, S. E
Shafer, R. B. (Veterans Admin. Hosp., 54t
48th Ave. S., Minneapolis, MN 55417). *J.*
18(7):676-679; 1977.

7491 BALLOON OCCLUSION OF SEGMENTAL HEPATI
ARTERIES: CONTROL OF BIOPSY-INDUCED
HEMOBILIA. (Eng.) Dunnick, N. R.; Doppman, J.
L.; Brereton, H. D. (Diagnostic Radiology Dept.
Building 10, Room 6S211, Clinical Center, Natl.
Inst. Health, Bethesda, MD 20014). *JAMA* 238(23
2524-2526; 1977.

7492 ENDOSCOPIC EVALUATION OF SMALL-BOWEL
LEUKEMIA. (Eng.) Wasser, A. H.; Spe
J. I. (Berkshire Medical Center, 725 North St.,
Pittsfield, MA 01201). *Am. J. Dig. Dis.* 22(11)
1028-1032; 1977.

7493 OPTIMUM VISCOSITY OF BARIUM SUSPENSIO
FOR USE IN THE DOUBLE CONTRAST BARIUM

AL. (Eng.) Cumberland, D. C. (Northern General
sp., Sheffield S5-7AU, England). *Gastrointest.*
diol. 2(2):169-174; 1977.

94 MENGHINI NEEDLE FRACTURE AFTER ATTEMPTED
LIVER BIOPSY. (Eng.) Purow, E.; Gros-
rg, S. J.; Wapnick, S. (Veterans Admin. Hosp.,
ooklyn, NY 11209). *Gastroenterology* 73(6):1404-
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95 THE POSSIBLE ROLE OF THE CARCINOEMBRYONIC
ANTIGEN (CEA) AND OTHER CARCINOFETAL ANTI-
NS IN MALIGNANT AND BENIGN DISEASES OF THE GASTRO-
TESTINAL TRACT. (Eng.) von Kleist, S. (Institut
Recherches Scientifiques sur le Cancer, Labora-
ire d'Immunochimie, F-94800 Villejuif, France).
Krebsforsch. Klin. Onkol. 90(1):1-11; 1977.

96 MOTION CORRECTED HEPATIC SCINTIGRAPHY:
AN OBJECTIVE CLINICAL EVALUATION. (Eng.)
rner, D. A.; Fordham, E. W.; Ali, A.; Rubin, P.
; Muerhrcke, R. C.; Oppenheim, B. E.; *et al.*
sh-Presbyterian-St. Luke's Medical Center, 1753
Congress Parkway, Chicago, IL 60612). *J. Nucl.*
l. 19(2):142-148; 1978.

97 DIFFERENTIAL HISTOLOGICAL DIAGNOSIS OF
GROUND GLASS CELLS BY TRICHROME STAINING.
g.) Gubetta, L.; Rizzetto, M.; Actis, G. C.;
me, G. (Ospedale Mauriziano, Cs. Turati 46,
28 Torino, Italy). *Pathologica* 69(995/996):
-489; 1977.

98 THE CLINICAL LABORATORY AND THE ESOPHAGUS.
(Eng.) Silber, W. (Medical Sch., Univ.
e Town, Cape Town, South Africa). *Curr. Surg.*
1):2-13; 1978.

7499 RISK OF IONIZING RADIATION [Abstract]. (Eng.) Mozsik, Gy. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):30-31; 1977.

7500 URINARY EXCRETION AND PATTERNS OF PROTEIN BINDING OF IODIPAMIDE (BILIGRAFIN FORTE): A COMPARISON OF THE INFUSION TECHNIQUE WITH THE SINGLE BOLUS INJECTION IN INTRAVENOUS CHOLANGIOGRAPHY. (Eng.) Husband, J.; Saxton, H. M. (Royal Marsden Hosp., Downs Rd., Sutton, Surrey SM2 5PT, England). *Br. J. Radiol.* 51(601):11-16; 1978.

7501 A SIMPLE SPECTROPHOTOMETRIC METHOD FOR MEASURING BILIARY IOGLYCAMIDE (BILIGRAM) CONCENTRATION. (Eng.) Bell, G. D.; McMullin, J.; Oliver, J.; McAlister, J. (City Hosp., Hucknell Rd., Nottingham, England). *Br. J. Radiol.* 51(601):17-19; 1978.

7502 THE RISK OF OESOPHAGOSCOPY AND GASTROSCOPY [Abstract]. (Eng.) Hafter, E. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):12-14; 1977.

See also, 7279, 7316, 7362, 7371, 7466, 7503, 7507, 7508, 7533, 7547, 7548, 7550, 7559, 7629, 7636, 7643, 7662, 7665, 7666, 7669, 7674, 7677, 7700, 7701, 7718, 7737, 7741, 7744, 7751, 7756, 7757, 7758, 7765, 7766, 7767, 7768, 7769, 7779, 7780, 7783, 7791, 7794, 7798, 7810, 7811, 7839, 7841, 7869, 7870, 7871, 7872, 7874, 7884, 7885, 7887, 7890, 7892, 7895, 7905, 7906, 7907, 7908, 7912, 7939, 7943, 7944, 7949, 7961, 7962, 7968, 7969, 7972.

GASTROINTESTINAL DISEASES

ESOPHAGUS

7503 RADIOLOGIC SPECTRUM OF OPPORTUNISTIC INFECTIONS OF THE UPPER GASTROINTESTINAL TRACT.

(Eng.) Athey, P. A.; Goldstein, H. M.; Dodd, G. D. (M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77030). *Am. J. Roentgenol.* 129(3):419-424; 1977.

The pathogenesis, clinical aspects, pathologic findings, and radiologic features in 34 patients with opportunistic infections of the esophagus and/or stomach are discussed. Most patients had hematologic disorders, with leukemia the underlying diagnosis in 19 patients. Most had more than one predisposing factor, since virtually all were receiving some form of chemotherapy, corticosteroids, and/or antibiotics. Only one patient, who had gastric candidiasis, had no known predisposing factors. The most common presenting symptoms were dysphagia and/or substernal pain or burning. Because of the debilitated clinical state of the patients, the diagnosis of opportunistic infection was often based solely on clinical findings and radiologic examination, and in only a few was an organism actually cultured. In approximately half the patients, *Candida albicans* was cultured from the oropharynx, urine, and/or blood. In two additional patients, there was evidence of a *Klebsiella* infection. Abnormal esophageal motility was the most common radiologic finding and was present in 33 patients with esophagitis. Abnormal motility was the sole initial finding with no morphologic abnormalities in only two patients. The majority of cases demonstrated a slightly dilated, virtually atonic esophagus. In most instances, the morphologic changes involved the entire thoracic esophagus, although in approximately one-third of the cases, the proximal half was relatively spared even when oropharyngeal manifestations were present. A shaggy marginal contour was observed radiologically in most cases of opportunistic esophagitis. Thickening and irregularity of the mucosal folds, simulating the appearance of varices, reflected the severity of the inflammatory changes. A continuing severe inflammatory reaction lead to frank stricture in one patient. Two patients demonstrated the unusual finding of one or several large nodular filling defects in the esophagus representing "fungus balls" due to candidiasis. Two patients had gastric monilial infection, and in one, the "fungus ball" appearance was noted in the esophagus, stomach, and duodenum. Both patients were seen radiologically to have several raised nodular lesions scattered about the stomach, and most nodules had central ulcerations giving the target appearance.

7504 GASTRIC EMPTYING IN PATIENTS WITH REFLUX ESOPHAGITIS OR BENIGN STRICTURES OF THE ESOPHAGUS SECONDARY TO REFLUX COMPARED TO CONTROLS.

(Eng.) Csendes, A.; Henriquez, A. (Hosp. J. J. Aguirre, Univ. Chile, Santiago, Chile). *Scand. J. Gastroenterol.* 13(2):205-207; 1978.

To elucidate the pathogenesis of reflux esophagitis, gastric emptying of liquids was measured in 12 patients with reflux esophagitis, 7 patients with benign esophageal strictures secondary to reflux, and 11 healthy controls. Lower esophageal sphincter pressure and gastric pH were simultaneously determined as well. The solutions used were phenol red (30 mg/1) in 150 mM NaCl (solution A), phenol red (500 mg/1) in 150 mM NaCl (solution B), and 150 mM NaCl (solution C) and were given by intubation after a 12-hr fast. The stomach was fully emptied by aspiration, 750 ml of solution A was instilled over 1-3 min, an 8-ml sample was taken at 10 min, 20 ml of solution B was added and vigorously mixed for 45 sec, and a second sample was taken. A similar procedure was followed at 20, 30, 45, 60, and 90 min using 15, 10, 10, 10, and 5 ml of solution B, resp. At 120 min, a sampl was taken, 200 ml of solution C were added for 45 sec, and a final sample taken. No significant differences were found among the test groups with respect to half-time of gastric emptying, although there was a slight tendency toward slower emptying in the patients with benign strictures. There we also no significant differences among the test groups with respect to gastric emptying time (<10 of the instilled volume remaining in the stomach) or with respect to the emptying curve (the volume of instilled solution remaining at the various sampling time points). Gastric retention does no appear to be an important factor in the productio either of reflux or of strictures.

7505 ASSOCIATION OF ASPIRIN INGESTION WITH SYMPTOMATIC ESOPHAGEAL HIATUS HERNIA.

(Eng.) Smith, V. M. (301 Saint Paul Place, Baltimore, MD 21202). *South. Med. J.* 71(Suppl. 1):45- 1978.

Radiographic studies were carried out to test the hypothesis that esophagitis in patients with hiat hernia can be caused by delays in the passage of gested aspirin from mouth to stomach. Barium-fil pouches of esophageal hiatal hernia were shown to trap barium above the diaphragm for prolonged per ods despite repeated swallows of water or additio barium suspension. Swallowed barium sulfate tabl were shown to pass through the esophagus into the stomach within seconds in normal subjects. In patients with esophageal hiatal hernia, however, tablets frequently remained within the esophagus, sometimes shifting up and down within the esophag for prolonged periods before entering the stomach. In other patients, the tablets stayed at the esop gogastric junction for the entire observation per of 5 to 15 min before entering the stomach. In a other experiment, a 5-g aspirin tablet placed in buccal space below the lower central incisor teet for 15 min produced a slightly raised lesion. Le ing a tablet in place for 2 hr resulted in the development of an area of intense erythema and fri-

ity. Eighteen hours later, the gingiva in the
displayed erythema, edema, and friability, de-
trating that aspirin can corrode alkaline mucosa
he absence of acid.

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(Eng.) Watkinson, G. (No affiliation
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COPIES. (Eng.) Spellberg, M. (No affilia-
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.) Blok, C.; Van Elk, P. J. (St. Geertruiden
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WITHOUT TRACHEOESOPHAGEAL FISTULA:
CTERISTIC RADIOGRAPHIC CHANGES. (Eng.) Crowe,
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Forest Univ., 300 S. Hawthorne Rd., Winston-
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Lally, J. J.; Gist, W. W.; Petit, C. A.
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Hutchinson, W. B., Jr.; Hutchinson,
(U.S. Naval Hosp., Long Beach, CA). *Ann.*
43(11):709-714; 1977.

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GASTRIC BLEEDING FROM THE INFERIOR PHRENIC
Y. (Eng.) Smith, D. C.; Kitching, G. B.
Linda Univ. Medical Center, Loma Linda, CA
). *Radiology* 125(3):613-614; 1977.

7514 THE SO-CALLED PRE-CANCEROUS LESIONS OF THE ESOPHAGUS. (Eng.) Messinetti, S.; Montori, A.; di Curzio, B.; Viceconte, G.; Stio, F. (III Clinica Chirurgica, Centro di Endoscopia Digestiva, Universita di Roma, Rome, Italy). *Rend. Gastroenterol.* 9(2):127-136; 1977.

7515 LOWER ESOPHAGEAL SPHINCTER AS A BARRIER TO GASTROESOPHAGEAL REFLUX BEFORE AND AFTER ANTIREFLUX SURGERY. (Eng.) Fisher, R. S. (Temple Univ. Sch. Medicine, Philadelphia, PA 19140). *South. Med. J.* 71(Suppl. 1):22-25; 1978.

7516 EFFICACY OF MEDICAL MANAGEMENT OF GASTROESOPHAGEAL REFLUX: A CRITICAL ASSESSMENT. (Eng.) Hollander, D.; Karris, G. (Wayne State Univ. Sch. Medicine, 540 E. Canfield, Detroit, MI 48201). *South. Med. J.* 71(Suppl. 1):41-42; 1978.

7517 TRACTION DIVERTICULUM OF THE ESOPHAGUS DUE TO FOREGUT CYST. (Eng.) Rosenlund, M. L.; Chatten, J.; Schnaufer, L. (Univ. Pennsylvania Sch. Medicine, 34th and Civic Center Blvd., Philadelphia, PA 19104). *J. Pediatr.* 92(2):338-339; 1978.

7518 ESOPHAGEAL RUPTURE IN A PREMATURE INFANT. (Eng.) Khanna, N. N.; Wijesekera, S.; Cushmore, F. N.; Schell, F. R. (St. John's Hosp., 800 E. Carpenter St., Springfield, IL 62702). *J. Pediatr.* 92(4):641-642; 1978.

7519 AN ANALYSIS OF RECURRENT ESOPHAGITIS FOLLOWING POSTERIOR GASTROPEXY. (Eng.) Maher, J. W.; Hollenbeck, J. I.; Woodward, E. R. (Coll. Medicine, Univ. Florida, Gainesville, FL 32610). *Ann. Surg.* 187(3):227-230; 1978.

7520 UPPER-ESOPHAGEAL SPHINCTER DYSFUNCTION: PATHOGENESIS AND TREATMENT. (Eng.) Hurwitz, A. L.; Duranceau, A. (Veterans Admin. Hosp., 4150 Clement St., San Francisco, CA 94121). *Am. J. Dig. Dis.* 23(3):275-281; 1978.

See also, 7315, 7470, 7473, 7498, 7502, 7565, 7601, 7613, 7617, 7860, 7862, 7865, 7911, 7935.

STOMACH

PYLORIC ANTRAL MUCOSAL WEBS. (Eng.)
Feliciano, D. V.; van Heerden, J. A. (Mayo
ate Sch. Medicine, Univ. Minnesota, Rochester,
Mayo Clin. Proc. 52(10):650-653; 1977.

The current literature on pyloric antral mucosal webs is reviewed, and the symptoms, treatment, and results of treatment of seven patients are presented. The incidence of this defect is low. It is unknown whether it is congenital or acquired. The small series presented contributes little to resolving this controversy; however, three cases had documented normal gastric roentgenograms with subsequent appearance of the antral webs on more recent roentgenograms. The presenting features in infants include persistent postprandial non-bile stained vomiting and secondary failure to thrive. Adults present with postprandial fullness and/or epigastric pain, with relief by vomiting. Standard gastric roentgenograms with barium reveal thin, constant septa or bands about 1-2 cm proximal to the pyloric ring seen as radiolucent lines projecting into the center of the antral lumen from the greater and lesser curvatures of the prepyloric antrum. Other antral-pyloric lesions that must be distinguished from antral webs include redundant gastric mucosa, hypertrophic gastric rugae, distal gastrospasm, cholecystogastrocolic bands, cicatricial post-ulcer scarring, and heterotopic pancreatic tissue. Antral webs may be difficult to visualize endoscopically, as in one of the presented cases in which two separate procedures were required. The endoscope can usually pass down to, and occasionally through, the central aperture of the diaphragm into the pyloric channel. Lysis of the web together with gastroplasty resulted in cure in the three patients in whom these procedures were performed, and finger fracture of the web together with pyloromyotomy and removal of ectopic pancreatic tissue were successful in a fourth. The other three patients in the series were asymptomatic and received no treatment. Surgical treatment is recommended for patients with obstruction.

7522 MULTIPLE BIOGENIC AMINE-SECRETING 'CARCINOID' TUMOUR OF THE STOMACH: A CASE REPORT.

(Eng.) Bader, L. V.; Lykke, A. W. J.; Hinterberger, H. (St. George Hosp., Kogarah 2217, New South Wales, Australia). *Pathology* 9(4):353-358; 1977.

An unusual case of gastric carcinoid tumor producing multiple biogenic amines is described in a patient with pernicious anemia. The patient was a 59-yr-old man who presented with a 3-month history of anorexia, abdominal discomfort, and clinical symptoms and signs of pernicious anemia. Anorexia and abdominal discomfort persisted after the patient was started on therapy for anemia, and epigastric tenderness was present. Gastroscopy revealed atrophic gastritis and a polypoid lesion, which was situated at the level of the mid-body on the greater curvature. The lesion had histological features of a carcinoid tumor or a related form of polypeptide "APUDoma." The serum glucagon levels were normal, but serum gastrin was greatly increased (2,650 ± 300 pM). Histopathological examination of the tumor, resected at laparotomy, showed uniform cells arranged partly in a trabecular pattern and partly forming solid masses. Ultrastructural examination showed that the neoplastic cells were tightly packed and irregularly polyhedral with well-defined cell and nuclear membranes. Two forms of secretory granules were identified, one being intensely electron dense and homogeneous and the other less dense with a vague and irregularly electron-lucent internal structure. Both forms of granules were bound by irregular limiting membranes, and the electron-dense variety was the most prevalent. The tumor contained the following biogenic amines: norepinephrine (26.8 μg/g), epinephrine (7.9 μg/g), and 5-hydroxytryptamine (1.1 μg/g). tumor gastrin concentration was 5,000 pg/g. Carci noid tumors may be associated with a wide variety clinical syndromes and the production of biogenic amines or polypeptides or a combination of these products.

7523 THE TWO HISTOLOGICAL TYPES OF GASTRIC CARCINOMA IN NORTHERN NIGERIA.

(Eng.) Mabogunje, O. A.; Subbuswamy, S. G.; Lawrie, J. H (Ahmadu Bello Univ. Teaching Hosp., Zaria, Nigeri *Gut* 19(5):425-429; 1978.

The proportion of two histological types of gastr carcinoma (intestinal type, characterized by the formation of glandular structures and islands and the diffuse type, with cells tending to separate and infiltrate individually) was investigated in 65 specimens from Northern Nigerian patients. Fo tumors were intestinal, 16 were diffuse, 2 were mixed, and 7 were unclassifiable. The intestinal type occurred with equal frequency as the diffuse type with regard to age group and sex distributio

7524 CARCINOMA OF THE STUMP AFTER GASTRIC RE SECTION FOR GASTRIC ULCER AND ADENOMATO POLYPS.

(Ger.) Wanzjan, E. N.; Astrozhnikov, Y. V.; Tschernousov, A. F. (All Union Res. Inst. for Clinical and Experimental Surgery, B. Pirogovskaj 2/6, 119874 Moscow, USSR). *Zentralbl. Chir.* 102 (22):1358-1364; 1977.

Primary carcinoma of gastric stump was found in patients who had undergone gastric resection for ulcer or for solitary or multiple adenomatous polyps. Thirty-five patients underwent surgery gastric stump carcinoma; the surgery was radical in 21. Extirpation of the gastric stump was performed in 12 patients and subtotal or combined subtotal resection in 9. Palliative surgery was performed on four patients, and the others had e ploratory laparotomy. The postoperative mortali was 4/35. Five patients died during the first 2 after surgery, five survived 2 yr, two survived 3-5 yr, and one has been alive for 5 yr and 5 months. Extirpation is the method of choice in the treatment of primary carcinoma of the gastric stump, while subtotal resection is recommended for primary exophytic carcinoma and for old and weakened patients.

7525 THE RISK FOR GASTRIC CARCINOMA AFTER PARTIAL GASTRECTOMY.

(Eng.) Domellof, L.; Janunger, K. G. (Univ. Hosp., S-901 85 Umea, Sweden). *Am. J. Surg.* 134(5):581-584; 1977.

A statistical evaluation of the incidence of gastric stump carcinoma in patients previously operated upon for ulcer disease was undertaken to define a risk group. Systematic endoscopic follow-up of patients operated upon since 1973 revealed 10 such cases. In addition, 188 patients who had undergone Billroth I resection and 488 patients who had undergone Billroth II resection (in 1952-1966) were followed up; 41/188 and 101/488 were unavailable for or refused the study and 39/188 and 159/488 were already dead, 3/159 from stump carcinoma. Gastroscopy of the remaining 108 and 228 patients revealed stump carcinoma in 4 and 7, resp. Of the 14 cases developing stump carcinoma after resection, ulcer disease was known in 10, so that a total of 20 cases (18 men) were analyzed. The risk ratio (observed:expected [O:E] number of stomach carcinoma cases) became <1 at 9-11 yr postoperatively, so that the postoperative periods 0-8 yr, 9-11 yr, and ≥12 yr were used in the analysis, which was corrected for known factors of bias (e.g., sex, age, area of residence); it was possible to combine the 20 cases without introducing bias. The O:E ratio was 0:3.3 at 0-8 yr, 2:2.1 at 9-11 yr, and 12:4.7 at ≥12 yr, the latter ratio being significant ($p=0.007$ for men, $p=0.006$ for women); the latter ratio became 12:6.7 and was not significant if the extreme assumption was made that all stump carcinomas are diagnosed 5 yr earlier than if no follow-up was performed. When the estimated annual incidence of stomach carcinoma in operated and nonoperated men 50-85 yr old was calculated, the expected number was higher in the operated patients, with the 50-55 yr age group having an expectation 12 times greater than that of the oldest group. There was a tendency for older patients undergoing operation for gastric ulcer to have a shorter time interval between operation and the development of carcinoma, whereas age at operation for duodenal ulcer seemed not to have any influence on the interval. There was no significant difference in the O:E ratio between gastric (5:2.9) and duodenal (7:4.4) ulcer patients. It is concluded that male patients resected for benign ulcer disease more than 11 yr previously constitute a risk group.

7526 GASTRIC DIVERTICULA FOLLOWING SUBTOTAL GASTRECTOMY.

(Eng.) Mihas, A. A.; Han, S. (Div. Gastroenterology, Univ. Alabama, Birmingham, AL 35294). *Gastrointest. Radiol.* 2(3):263-265; 1977.

The cases of four patients in whom gastric diverticula developed in unusual sites following subtotal gastrectomy are presented. The first patient was a 22-yr-old woman with a life-long history of upper gastrointestinal problems. She had previously undergone a posterior gastrojejunostomy for duodenal obstruction, excision of a congenital duodenal diaphragm together with jejunojejunostomy, and a pyloroplasty with a side-to-side duodenojejunostomy for pyloric obstruction. Following the latter operation, she continued having postprandial epigastric pain and vomiting. An upper gastrointestinal series showed prolapse of gastric mucosa into a large duodenum, producing symmetrical defects of the gastroduodenal junction, and a gastric diverticulum. Endoscopy revealed hyperplastic mucosa obstructing the pyloric stoma and a greatly dilated duodenum. A large polypoid mass of gastric mucosa that appeared to be in a position to obstruct intermittently the pylorus and produce a diverticulum of the greater curvature was found at laparotomy. The mass was excised with apparently satisfactory results. The second patient was a 56-yr-old man who had undergone a subtotal gastrectomy with Billroth II anastomosis for peptic ulcer disease 5 yr before developing a gastric diverticulum proximal to the gastrojejunostomy. The third patient was a 58-yr-old man who had undergone a vagotomy and partial gastrectomy with a Billroth II anastomosis for a bleeding duodenal ulcer 17 yr prior to developing almost complete gastric obstruction. Upper gastrointestinal series showed a round mass in both afferent and efferent loops at the anastomosis. At laparotomy, the mass was found to be produced by a prolapsed gastric mucosa that was greatly redundant and hypertrophied. The fourth patient, a 44-yr-old woman, developed a gastric diverticulum simulating an ulcer on the lesser curvature. She had previously undergone subtotal gastrectomy with Billroth II anastomosis followed by further gastric resection with Roux-en-Y anastomosis and vagotomy for duodenal ulcer disease.

7527 MORPHOLOGY OF THE GASTRIC MUCOSA, GASTRIC SECRETION AND SERUM GASTRIN CONCENTRATION FOLLOWING A TEST MEAL.

(Eng.) Kaess, H.; Cheli, R.; De Benedetti, F.; Ciancamerla, D.; Dorner, M. (Stadt. Krankenhaus Munchen-Schwabing, Kolnerplatz 1, D-8000 Munich 40, W. Germany). *Digestion* 17(1): 18-28; 1978.

To investigate the gastrin response to a physiological stimulus, the relationship between the histological state of the antral and fundic mucosa, HCl secretion, and serum gastrin response after a test meal of a liquid meat extract was studied in 32 subjects with dyspepsia. In the patients with a normal fundic mucosa (11) or superficial gastritis (3), there was a significant increase in fasting serum gastrin concentration (from 74 ± 4 to 97 ± 5 pg/ml, $p<0.01$) in response to the test meal. In patients with atrophic lesions of the fundic mucosa (18), serum gastrin levels in the fasting state were significantly higher (218 ± 40 pg/ml, $p<0.025$) than in the normal group, and also significantly higher (290 ± 59 pg/ml, $p<0.025$) following the test meal. Fasting and postprandial gastrin concentrations were lower in the 14 patients with antral atrophy than in the 18 with a normal antral mucosa or superficial antral gastritis. The highest levels for basal (324 pg/ml) and postprandial gastrinemia (peak 436 ± 116 pg/ml) occurred in the group of nine patients having a normal antrum associated with atrophic lesions of the fundus. The integrated gastrin response was 4.0 ± 0.8 ng/90 min ($p<0.05$) in the group with atrophic lesions of the fundus and 0.9 ± 0.2 ng/90 min in those with a normal fundus. Patients with atrophic lesions of the antrum had a gastrin response of 1.1 ± 0.3 ng/90 min compared to 3.9 ± 1.1 ng/90 min in the normal antrum group. Basal hypergastrinemia (>100 pg/ml) was seen in 10/14 patients with poststimulating achlorhydria. Gastrin output was not affected by the test meal in patients with atrophic antral lesions, but in those with normal antrum and atrophic fundus, feeding provoked a significant ($p<0.01$) gastrin response (7.0 ± 1.9 ng/90 min) compared to subjects with normal antrum and fundus (0.9 ± 0.2 ng/90 min). The integrated gastrin output was 0-2.3 pg/90 min in subjects with HCl secretion after maximal stimulation. Elevated gastrin responses (up to 21.2 pg/90 min) were observed in subjects with poststimulatory achlorhydria. There was a significant correlation between basal gastrin concentration and integrated gastrin output in subjects presenting achlorhydria and a normal antrum ($r=0.94$) in contrast to those with achlorhydria and atrophic antral lesions. The results confirm previous investigations on serum gastrin concentration and chronic atrophic gastritis and favor a major role for HCl secretion in gastrin response.

7528 PROTEINLOSING GASTROPATHY WITH GASTRIC HYPERSECRETION OF ACID (H+) AND PEPSIN AND HYPERGASTRINEMIA. A CASE REPORT. (Eng.)

Waldum, H. L.; Burhol, P. G.; Nordoe, A.; Kearney, M. (Univ. Hosp., 9012 Tromsoe, Norway). *Acta Hepatogastroenterol.* 24(4):296-301; 1977.

The case of a patient with protein-losing gastropathy, acid and pepsin hypersecretion, and hypergastrinemia is reported. The patient, a 21-yr-old woman, presented with peripheral edema and slight anemia. An upper gastrointestinal series demonstrated gastric folds and two diverticula in the duodenum. Gastroscopy confirmed this appearance, and biopsy revealed changes of chronic superficial gastritis, with atrophy of the superficial glands and infiltration of the lamina propria with nonspecific inflammatory cells. The basal acid and pepsin outputs were 19.1 mEq/hr and 241 mg/hr, resp., and the pentagastrin-stimulated outputs were 39.7 mEq/hr and 485 mg/hr, resp. The fasting serum gastrin level was also elevated, at levels of 216 to 370 pg/ml. The diagnosis of Zollinger-Ellison syndrome was excluded, as the acid secretion and serum gastrin level decreased during the 22-month observation period. In addition, the basal gastric acid concentration (55.1 mEq/l) was lower than usually found in patients with gastrinoma. Acid secretion fell after both secretin and glucagon injection (1.9 and 1.1 mEq/hr, resp.), making the diagnosis of Zollinger-Ellison syndrome even more unlikely. The pepsin output in this patient was even more increased than the acid output, which is contrary to the usual findings in gastrinoma. The giant gastric folds were less prominent at repeat gastroscopy at the end of the observation period.

7529 PRIMARY GASTRIC LYMPHOID PROLIFERATIONS: IMMUNOLOGICAL CRITERIA TO DISTINGUISH GASTRIC LYMPHOMA FROM REACTIVE HYPERPLASIA. (Eng.)

Palestro, G.; Poggio, E.; Leonardo, E.; Coda, R. (Istituto di Anatomia e Istologia Patologica, Universita di Torino, Via Santena 7, 10126, Torino, Italy). *Oncology* 34(4):164-167; 1977.

Six patients with a marked gastric lymphoid "hyperplasia," two of these with generalized lymphoma and the others suspected for primary gastric lymphoma, were investigated to discriminate between simple reactive hyperplasias and lymphomatous proliferations. The histological and ultrastructural data confirmed the difficulty of distinguishing reactive lymphoid hyperplasia from malignant lymphoma. In all cases, the presence of inflammatory cells other than mature lymphocytes and of true lymphoid germinal centers did not give an absolutely useful diagnostic criterion. These features, less or more evident, were associated with large and coarsely shaped and irregularly distributed nodules, many of which lacked a recognizable germinal center; moreover, numerous mitoses were noted in the extranodular areas. On histological and clinical grounds, four cases with conspicuous lymphoid hyperplasia and infiltration of the gastric wall were interpreted as primary gastric lymphomas; in the other two, an associated generalized lymphoma was present. In the two patients with generalized lymphoma and gastric involvement and in two of the four with primary striking gastric lymphoid hyperplasia, the number of B lymphocytes was increased in both peripheral blood and in the lymph node suspensions, whereas those in the remaining two patients were within the normal range. On the other hand, E-rosetting and T-cells had lower than normal levels in the same four patients. In the peripheral blood, the percentages of E-rosetting cells and T lymphocytes were 25% and 30%, 40% and 20%, 34% and 30%, an 35% and 25%, resp., in the four patients, whereas th corresponding values in the other two patients were 58% and 65% and 54% and 60%, which were within the normal range. Lymphocyte suspensions from perigastr lymph nodes of one patient with generalized lymphoma and three patients with primary gastric lymphoid hyperplasia were tested. An increased number of B lymp ocytes was found in the patient with generalized lymphoma, whereas only the one patient with hyperplasia and increased B lymphocytes in the blood had an increased number of B lymphocytes in the lymphocyte suspension. These data suggest that the primitive exuberant gastric lymphoid hyperplasias may be distinguished in two sets as follows: the first withou immunological disorders and the second with peripheral blood signs of immunological alterations.

7530 GASTRIC POLYPOSIS DUE TO MULTIPLE HYPERPLASTIC ADENOMATOUS POLYPS. (Eng.)

Weaver, G. A.; Kleinman, M. S. (Dept. Medicine, Mary Imogene Bassett Hosp., Cooperstown, NY 13326). *Am. J. Dig. Dis.* 23(4):346-352; 1978.

Four cases of gastric polyposis (multiple gastric polyps numbering more than 5 in one case and more than 10 in the others) are presented in which the polyps involved diffusely a specific region of the stomach. Presenting symptoms included a lump in the stomach, nausea for approximately 6 months, intermittent upper abdominal pain for 5 yr, and abdominal pain developing after an episode of diarrhea. Results of upper gastrointestinal series showed polypoid antral lesions in cases 1 and 2 and multiple filling defects in case 4; results were normal in case 3. Gastric analysis results were equivocal for gastric acid in case 1, showed no aci the fasting state or with betazole stimulation in es 2 and 4, and showed 2 mEq of acid in a 1-hr al collection and 27 mEq in a 1-hr betazole stimted collection in case 3. In cases 1, 2, and 3, oscopy or gastroscopy revealed multiple polypoid ions in the antrum. In case 4, most lesions e present on the greater curvature and were ated at the junction of the antrum and the y. In all cases, superficial biopsies of polyps revealed ulcerated gastric mucosa infiltration of gastric mucosa with inflamory cells. In cases 2 and 4, several biopsies ealed tissue granulation, and in case 4, re was some cystic dilatation of the gastric nds. These hyperplastic adenomatous polyps quently appeared as ulcerated elevations of oscopically normal-appearing gastric mucosa. polyps ranged in appearance from type I to e III as classified by Yamada. Patients 2, nd 4 were taking thiazide diuretics; pats 2 and 4 were taking other drugs as well; ients 2, 3, and 4 were taking thiazide diuretics; ients 2 and 4 were taking other drugs as well; patients 2 and 3 consumed alcohol. Patient 4 pernicious anemia and marked bile reflux. The es of these factors in the pathogenesis of gas- polyposis require further consideration. authors conclude that, since carcinoma occurring these polyps is rare, nonoperative management is ably indicated.

SPONTANEOUS DISAPPEARANCE OF GASTRIC POLYPS: REPORT OF FOUR CASES.

(Eng.) amoto, Y.; Nishitani, H.; Oshiumi, Y.; Okawa, (Faculty Medicine, Kyushu Univ., Fukuoka, an). *Am. J. Roentgenol.* 129(5):893-897; 1977.

cases of 4 patients among 88 in whom benign ric polyps were found are presented to illuse the rare outcome in which these polyps taneously disappeared or regressed. A smooth nculated polyp 0.8 cm in diameter that became bulated over 22 months and a 3.0 x 1.5-cm polyp formed during these 22 months in a 55-yr-old n were followed up at 24 months to reveal that large polyp had broken off at its base, leaving a small hemispherical stump. A pedunculated x 1.1-cm polyp in a 36-yr-old woman was foled up at 4.5 yr to reveal only a small hemierical stump 1-cm in diameter, indicating that polyp had broken off at its base. A pedunted 3.5 x 1.5-cm polyp was found in a 62-yr- woman; 2 months later, the polyp surface was ed, hemorrhagic, and irregular; 23 months r, the polyp had decreased in size to 1.5 x cm. A hemispherical polyp 0.8 cm in diameter found in a 51-yr-old woman; it was unchanged onths later; but 4 yr later, the polyp could be detected, and the gastric mucosa was normal he polyp's former site.

2 THE EFFECT OF ANTRECTOMY OR TOTAL GASTRECTOMY ON CALCIUM-INDUCED GASTRIC SE- ION AND GASTRIN RELEASE IN MAN.

(Ger.) Schafmayer, A.; Borger, H. W.; Stuhler, T.; Siewert, R.; Becker, H. D. (Klinik und Poliklinik fur Allgemeinchirurgie, Universitat Gottingen, Gosslerstrasse 10, D-3400 Gottingen, W. Germany). *Klin. Wochenschr.* 55(23):1159-1163; 1977.

The effect of antrectomy or of total gastrectomy on calcium-induced gastric secretion and gastrin release was studied by radioimmunoassay in 8 patients who underwent antrectomy and gastroduodenostomy (Billroth I), 12 patients who underwent antrectomy and gastrojejunostomy (Billroth II), 9 patients who underwent total gastrectomy and esophagojejunostomy, and 20 healthy subjects not operated on. The probands received calcium infusion (4 mg/kg/hr for 4.5 hr, i.v.) as calcium gluconate accompanied by a slow i.v. infusion of 4 mg/kg [illegible] during the first 30 min. The basal serum gastrin level, peak gastrin level, and total gastrin release were reduced in the patients compared with the controls. In the control, calcium stimulated gastric secretion and gastrin release. After antrectomy, gastric secretion was still stimulated by calcium without any change in the serum gastrin levels. After total gastrectomy, the basal serum gastrin concentration was further reduced; calcium did not cause gastrin release. The results show that calcium-induced gastric secretion is due to direct action on the parietal cells and to gastrin release from the antrum.

7533 GASTRIC VARICES: PROBLEM IN DIAGNOSIS.

(Eng.) Marshall, J. P., II; Smith, P. D.; Hoyumpa, A. M., Jr. (Veterans Admin. Hosp., Nashville, TN 37203). *Am. J. Dig. Dis.* 22(11): 947-955; 1977.

Three cases that illustrate the characteristics of gastric varices and factors in their diagnosis and management are presented. The first patient was a 39-yr-old alcoholic man with recurrent pancreatitis, abdominal pain, and gastric bleeding. Endoscopy repeatedly demonstrated large gastric "folds" corresponding to a mass seen in a barium study. The findings in both studies were misinterpreted; the correct preoperative diagnosis of splenic vein obstruction and secondary gastric varices was finally established by arteriography and splenoportography. In the second patient, a 75-yr-old alcoholic man with recurrent vomiting, barium studies revealed a mass in the fundus that was thought to be a neoplasm. The correct diagnosis was made on endoscopy and confirmed by arteriography. The third patient was a 42-yr-old alcoholic with a long history of chronic pancreatitis. He presented with a 1-week history of severe abdominal pain. Both radiologic and endoscopic examination suggested a malignancy, and a biopsy was taken during endoscopy. Only normal gastric mucosa was seen, and no bleeding ensued. A celiac angiogram demonstrated almost total occlusion of the splenic vein in the region of the midpancreas with marked collateral filling of the short gastric veins and gastroepiploic veins. The patient's symptoms resolved on conservative management with nasogastric suction, possibly due to relief of splenic vein obstruction or development of collateral circulation. These cases show the value of arteriography in the diagnosis of gastric varices.

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7538 THE HISTORY OF GASTRIC SURGERY. (Spa.) Hidalgo Huerta, M. (No affiliation given). *Rev. Esp. Enferm. Apar. Dig.* 51(6):631-642; 1977.

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(Rus.) Sukhin, V. S. (Clinic General Surgery,
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kenhaus Rostock-Sudstadt, Otto-Grottewohl-Ring,
DDR-25 Rostock, E. Germany). *Zentralbl. Chir.*
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BILLROTH I AND BILLROTH II GASTRIC RE-
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lavek, D.; Blaich, E.; Heinkel, K.; Rosch, W.
(Kreiskrankenhaus, Eberhardstrasse, D-7320 Gop-
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O.; Ihamaki, T. (Universitatsklinik Helsinki, S
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SINOGEN-PEPSIN FOR THE DIAGNOSIS OF G
TRIC CANCER METASTASES. (Rus.) Kalinovsky, V.
Mel'nikov, R. A.; Seits, I. F. (N. N. Petrov Re
Inst. Oncology, Leningrad, USSR). *Vopr. Onkol.*
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CER OF THE CARDIA. (Rus.) Pavlov, K
Stolyarov, V. I.; Volkov, O. N.; Stefanenko, Iu
Maleret, P. O. (N. N. Petrov Res. Inst. Oncolog
Leningrad, USSR). *Vestn. Khir.* 119(7):110-112;

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Weiss, W.; Neumayr, A. (Krankenanstalt Rudolf-
stiftung der Stadt Wien, Juchgasse 25, A-1030
Vienna, Austria). *Wien. Med. Wochenschr.* 128(2
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ALTERATIONS OF THE GASTRIC STUMP (G
Voigtsberger, P.; Bohm, S.; Vollmar, F.; Pothe,
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WITH CANCER OF THE GASTRIC STUMP. (R

ɔin, M. D. (No affiliation given). *Sov. Med.* :47-50; 1977.

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7576 PROPHYLAXIS OF DISTURBANCES IN THE CONTRACTILE FUNCTION OF THE HEART AND OF GASTRIC ULCERATION DURING EMOTIONAL STRESS BY MEANS OF SODIUM OXYBUTYRATE AND VITAMIN E. (Rus.) Meerson, F. Z.; Giber, L. M.; Markovskaia, G. I.; Radzievskii, S. A.; Rozhitskaia, I. I.; Kogan, A. Kh. (Inst. General Pathology and Physiology, Acad. Medical Sciences, Moscow, USSR). *Dokl. Akad. Nauk SSSR* 237(5):1230-1233; 1977.

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See also, 7326, 7352, 7366, 7378, 7473, 7474, 748
7487, 7499, 7502, 7503, 7504, 7507, 750
7511, 7513, 7515, 7516, 7598, 7601, 760
7603, 7606, 7608, 7611, 7613, 7615, 761
7617, 7618, 7620, 7621, 7622, 7911, 792
7933, 7934, 7935, 7936.

Peptic Ulcers

7 THE GIANT DUODENAL ULCER SYNDROME. (Eng.)

Segal, I.; Solomon, A.; Ou Tim, L.; Law-
, H. H.; Sottomayor, M. C. C. G. (Baragwanath
., Johannesburg, South Africa). *S. Afr. Med.*
52(18):724-727; 1977.

cases of 13 patients with giant duodenal ulcer
J) are reviewed with respect to clinical, rad-
gical, endoscopic, and pathological features,
the differential diagnosis and treatment of
s entity are briefly discussed. The symptoms
e characterized by a chronic history of exacer-
ions and remissions. Pain was often situated
he right hypochondrium, always radiated to the
, and was aggravated by food and antacids.
ting, weight loss (all cases), hematemesis or
na due to gastrointestinal tract bleeding
cases), pallor, and mild upper abdominal
erness (especially in the epigastrium) were also
rved. The ulcer may be so large that the crater
mimic a normal duodenal bulb in radiological ex-
ations; other radiological signs may include a
lous or destroyed pylorus, a crater of con-
t size and shape without contractions, an
nt mucosal pattern over the crater and con-
ction distal to the crater, single or multiple
ing defects in the base of the ulcer, compres-
of the third portion of the duodenum by the
ntery due to the inflammatory process, a per-
ent and unchanging round collection of air in
crater, and retention of contrast material
he ulcer for several hours after examination.
scopy reveals a widened, edematous, hyperemic
ric sphincter; the ulcer is clearly seen as a
necrotic trough extending circumferentially
nd the whole mucosa, virtually replacing the
enal wall. Pathologically, the crater often
aces the duodenal bulb and erodes into the
of the pancreas, forming a walled-off perfor-
n; distortion of the gastric antrum by the
ammatory process extends into the mesenteric
causing compression of the third portion of
duodenum; and adherence to surrounding structure
ommon. Histology confirms the benign nature
he lesion. The history and presentation of
are confusing and protean, complicating the
nosis. Radiology differentiates GDU clearly
posterior penetrating ulcer. Treatment is
important because the incidence of serious
lications and the mortality rate (40-67% in
iously reported series) are quite high. Of
13 patients in this series, 1 died, 9 under-
surgery, and 3 were treated medically (of
1 improved and 2 later required surgery).

SERUM GASTRIC INHIBITORY POLYPEPTIDE (GIP) IN DUODENAL ULCER DISEASE: RELATIONSHIP
UCOSE TOLERANCE, INSULIN, AND GASTRIN RELEASE.

.) Arnold, R.; Creutzfeldt, W.; Ebert, R.;
er, H. D.; Borger, H. W.; Schafmayer, A. (Medi-
sche Univ.-Klinik, Humboldtallee 1, D-3400
Gottingen, W. Germany). *Scand. J. Gastroenterol.*
13(1):41-47; 1978.

Basal and food-stimulated serum immunoreactive gastric inhibitory polypeptide (IR-GIP), gastrin (IRG), and insulin (IRI) levels were estimated in 41 normal weight patients with chronic duodenal ulcer disease and 25 weight- and age-matched controls to determine whether gastric acid hypersecretion in duodenal ulcer disease is related to a faulty GIP secretion. A pathological glucose tolerance (a 60- plus 120-min sum of blood glucose levels >310 mg/dl) was observed in 15/41 patients during standard oral glucose tolerance tests with 75 g of glucose and in 28/41 patients after ingestion of a high-calorie test meal (1,031 calories ingested within 10 min). The test meal induced a rapid rise of IR-GIP, IRI, glucose, and IRG in duodenal ulcer patients and controls for 5 hr, but all four parameters increased to significantly higher ($p<0.02$) levels in the patients; serum IR-GIP increased most markedly in patients with a pathological glucose tolerance response during the test meal and remained significantly elevated for 5 hr. The GIP response of patients with a normal glucose tolerance response to the test meal was less marked and only higher than the controls for 2 hr. The duodenal ulcer patients had significantly greater integrated IR-GIP, IRI, and glucose responses than did the controls (IR-GIP: 266.4 ± 27.3 and 108.1 ± 10.9 ng/ml/180 min, resp.; IRI: 10.4 ± 1.3 and 4.9 ± 0.6 mU/ml/180 min, resp.; glucose: 13.9 ± 1.3 and 4.7 ± 0.7 g/100 ml/180 min, resp., $p<0.02$ in all cases). These responses were significantly greater in patients with pathological than in those with normal glucose responses (IR-GIP: 302.8 ± 18.4 and 196.2 ± 12.8 ng/ml/180 min, resp., $p<0.005$; IRI: 13.4 ± 0.6 and 7.2 ± 0.3 mU/ml/180 min, resp., $p<0.02$; glucose: 18.5 ± 0.5 and 8.7 ± 0.3 g/100 ml/180 min, resp., $p<0.02$). The results rule out the possibility that hyposecretion of GIP is a factor in the pathogenesis of gastric acid hypersecretion in duodenal ulcer patients.

7589 GASTRIC MUCOSAL HISTAMINE IN DUODENAL-ULCER PATIENTS: RELEASE BY SECRETIN.

(Eng.) Domschke, W.; Subramanian, N.; Mitznegg, P.; Baenkler, H. W.; Domschke, S.; Wunsch, E. (Dept. Medicine, Univ. Erlangen-Nurnberg, Krankenhausstr. 12, D-8520 Erlangen, W. Germany). *Acta Hepato-gastroenterol. (Stuttg.)* 24(6):444-446; 1977.

Since many duodenal ulcer patients manifest a local anaphylactic skin reaction to intradermal secretin, studies were carried out to determine whether secretin-induced histamine release also occurs in the gastrointestinal tract of duodenal ulcer patients. Biopsy samples from the fundus of five duodenal ulcer patients with an anaphylactic skin reaction to intradermal secretin and of four healthy controls were superfused with phosphate buffer alone or with buffer containing synthetic secretin

(20 Clinical U/ml). Mucosal specimens from the duodenal ulcer patients released histamine in response to secretin, reaching a 65% increase above the basal level ($p<0.05$), whereas specimens from the controls showed no change in response to the infusion. The histamine content of untreated gastric mucosa was about twice as high as that in controls ($p<0.02$). The elevated mucosal histamine could account for the basal and stimulated gastric hypersecretion seen in duodenal ulcer patients. Additionally, the results are compatible with the concept that, in a certain type of duodenal ulceration, secretin stimulates rather than inhibits gastric secretion.

7590 THE EFFECT OF ORAL LOCAL ANAESTHETIC AND ALKALI ON BASAL AND FOOD-STIMULATED SERUM GASTRIN LEVELS IN PATIENTS WITH DUODENAL ULCER.

(Eng.) Barbezat, G. O.; Vinik, A. I.; Grant, B. (Groote Schuur Hosp., Observatory, 7925, Cape, South Africa). *Scand. J. Gastroenterol.* 13(3):321-323; 1978.

The effect of p.o. therapeutic doses of alkali (aluminum hydroxide, 1.2 g plus magnesium hydroxide, 0.4 g), local anesthetic (oxethazaine, 40 mg), a combination of alkali and anesthetic, or water (20 ml) as control on basal and food-stimulated serum gastrin levels was investigated in 12 asymptomatic patients with duodenal ulcer. The basal serum gastrin levels were all within normal limits. Treatment with any of the three agents did not significantly alter these concentrations. The ingestion of meat extract was associated with a mean rise in serum gastrin levels in all treatment groups. Fifteen minutes after the meal, patients pretreated with oxethazaine had significantly lower serum gastrin levels than did those who received water ($p<0.05$), alkali and oxethazaine ($p<0.01$), or alkali alone ($p<0.001$). There was no significant difference among the water, alkali plus oxethazaine, or alkali treated groups. After a further 15 min, only the alkali and the oxethazaine groups showed any significant difference from controls ($p<0.05$). This study confirms that noncalcium-containing alkalis, whether given alone or with a local anesthetic, do not alter basal serum gastrin levels in man.

7591 DOUBLE-BLIND CONTROLLED TRIAL OF AMYLOPECTIN SULPHATE (DEPEPSEN) IN THE SYMPTOMATIC TREATMENT OF DUODENAL ULCER.

(Eng.) Baron, J. H.; Gribble, R. J. N.; Holdstock, D. J.; Misiewicz, J. J. (Hammersmith Hosp., London W12 OHS, England). *Gut* 18(9):723-724; 1977.

A double-blind controlled trial of amylopectin sulfate (Depepsen) in the treatment of duodenal ulcer was carried out in male patients with radiological evidence of duodenal ulcer crater or deformity in the previous 2 yr, a 6-month to 5-yr history of duodenal ulcer symptoms, and ulcer pain on at least 3 of 7 days prior to admission to the trial. The patients received their customary antacids and either amylopectin sulfate (500 mg, tablet, 20 patients) or identically appearing placebo (500 mg dextrose, 21 patients) to be chewed and swallowed with a drink every 2 hr for six dose day. The patients kept diary cards recording the presence, absence, and severity (0, 1, or 2) of pain and the number of test and antacid tablets co sumed each day, which were collected every 2 weeks for 6 weeks. Duodenoscopy was not available when the study was undertaken. Diary cards were satisfactorily completed by 12/20 and 16/21 patients in the two groups, resp. Depepsen had no advantage over placebo with respect to mean number of days and nights with ulcer pain/patient, mean number of antacid tablets consumed/patient/week, or the severity of pain.

7592 VARIATIONS IN SERUM PROLACTIN FOLLOWING CIMETIDINE TREATMENT FOR PEPTIC ULCER DISEASE.

(Eng.) Delle Fave, G. F.; Tamburrano, G.; De Magistris, L.; Natoli, C.; Santoro, M. L.; Carratu, R.; *et al.* (Cattedra di Gastroenterologia II Clinica Medica, Policlinico Umberto I, 00100 Roma, Italy). *Rend. Gastroenterol.* 9(2):142-143; 1977.

Variations in serum prolactin levels were studied in 10 patients before and after cimetidine treatment for peptic ulcer disease. The first group of patients (5 men and 2 women, aged 27-60 yr) received 1.6 g of cimetidine daily, p.o., for duodenal ulcer (2 cases), recurrent postgastrectomy ulcer (3 cases), or Zollinger-Ellison syndrome. The second group (3 men, aged 35-65 yr) received 1.0 g of cimetidine daily for duodenal ulcer. The drug was given in four daily doses for 8 weeks. The pretreatment prolactin levels were within normal limits in all patients. In the patients who received the higher dose of cimetidine, these values showed a constant increase over the 8-week treatment period, reaching 12.5-32 ng/ml (mean, 2 2.9, $p<0.001$). These values returned to normal 3 to 4 weeks after the treatment was discontinued. There was no significant change in the prolactin levels in patients who received the lower dose of cimetidine. Gynecomastia and galactorrhea were observed respectively in two of the seven patient who received the higher dose and in none of the patients who received the lower dose. These observations show that the effect of cimetidine on prolactin levels is probably dose-dependent. The mechanism responsible remains to be elucidated.

7593 THE USE OF GLIPTIDE IN PATIENTS WITH DUODENAL ULCERS.

(Eng.) Gilmore, A. M.; McCarthy, C. F.; Feighery, C.; Weir, D. G.; O'Neill, M.; Whelton, M.; *et al.* (Regional Hosp., Galway, Ireland). *Ir. Med. J.* 70(20):615-617; 19

A double-blind study of the value of Gliptide (a sulfaglycopeptide, 50 mg [2 tablets] t.i.d.) in t treatment of duodenal ulcers was carried out in 7 patients, 39 of whom received this drug and 37 of whom received placebo. Significantly more ulcers healed in the Gliptide group than in the placebo group ($p<0.02$) during the 8 weeks of observation. Gliptide treatment was also significantly better

lacebo in the treatment of ulcers in patients in whom
ome deformity of the duodenal cap was present (p<
.01). Although this treatment was superior to
lacebo, only 50% of ulcers had healed at 8 weeks.

594 METHYL-PROSTAGLANDIN E_2 ANALOGUES FOR HEALING OF GASTRODUODENAL ULCERS. (Eng.)
ybicka, J.; Gibinski, K. (Silesian Sch. Medicine,
atowice, Poland). *Scand. J. Gastroenterol.* 13(2):
55-159; 1978.

double-blind clinical trial of the value of meth-
l-prostaglandin E_2 ($mPGE_2$) analogues in the treat-
ent of ulcers was carried out in 117 men with gas-
roduodenal ulcers. Thirty-six patients received
lacebo, 25 received 15(R) 15-$mPGE_2$ methyl ester
$mPGE_2$ R, 2.0 μg/kg, t.i.d.), 36 received 15(S)
5-$mPGE_2$ methyl ester ($mPGE_2$ S, 1.5 μg/kg, 3-4
imes/day), and 20 received 16,16-dimethyl PGE_2
di $mPGE_2$, 1.5 μg/kg, 3-4 times/day). Prostaglandin
reatment resulted in significant decreases in both
asal acid output ($p<0.05$, $p<0.001$, $p<0.001$, and
<0.001 for $mPGE_2$ R, $mPGE_2$ S, di $mPGE_2$, and pooled
nalogues, resp.) and mean acid output ($p<0.01$,
<0.001, $p<0.001$, and $p<0.001$, resp.) in comparison
ith the levels in controls. The number of duodenal
cers that cicatricized was significantly higher
<0.01) in the PGE_2-treated patients than that in
ntrols, and this was especially true in patients
eated with $mPGE_2$ S ($p<0.001$, in comparison with
ntrols). This healing was not seen in gastric
cers.

95 TREATMENT OF PEPTIC ULCER IN ZOLLINGER-ELLISON SYNDROME WITH HISTAMINE H_2 RE-
PTOR ANTAGONISTS. (Ger.) Hausamen, T. U.;
itsch, W. P.; Scholten, T.; Jungblut, R.; Stroh-
yer, G. (Stadtische Kliniken, Beurhausstr. 40,
00 Dortmund, W. Germany). *Dtsch. Med. Wochenschr.*
2(47):1709-1712; 1977.

ur patients with recurrent peptic ulcer due to
llinger-Ellison syndrome were treated with the
stamine H_2-receptor antagonists cimetidine and
tiamide. All patients were treated with cimeti-
ne (5 x 200 mg/day) for 1.5-4.5 months. One
tient was at first treated with metiamide in the
me dosage, and another received methantheline
omide (50 mg) in addition to metiamide. The
cerations were completely healed in all patients.
o patients developed recurrent ulcers after the
eatment was stopped, but responded to a second
urse. One patient developed acute hepatitis B
llowing the cimetidine treatment; the course of
e hepatitis may have been unfavorably affected
cimetidine. No other side-effects were noted,
r was there any significant change in the basal
rum gastrin concentration or an increase in the
secretion. While total gastrectomy remains
e treatment of choice in Zollinger-Ellison syn-
ome, cimetidine treatment should be considered
the patient refuses operation or if surgery is
feasible in view of the poor general condition
the patient.

7596 FEVER, ABDOMINAL PAIN, AND LEUCOPENIA DURING TREATMENT WITH CIMETIDINE. (Eng.) Corbett, C. L.; Holdsworth, C. D. (Royal Infirmary, Sheffield S6 3DA, England). *Br. Med. J.* 1(6115): 753-754; 1978.

7597 THE USE OF CIMETIDINE IN SEVERE DUODENAL ULCERATION. (Eng.) Gray, G.; Smith, I. S.; Mackenzie, I.; Gillespie, G. (Victoria Infirmary, Glasgow, Scotland). *Scott. Med. J.* 22(4):293-294; 1977.

7598 PREVALENCE OF PEPTIC ULCER AND ITS COMPLICATIONS. (Eng.) MacKay, C. (Western Infirmary, Glasgow, Scotland). *Scott. Med. J.* 22(4):288-289; 1977.

7599 MORPHOFUNCTIONAL CHANGES OF THE PANCREAS IN ULCER DISEASE. (Rus.) Teply, B. K. (Dept. Clinical Surgery, Kiev Medical Inst., Kiev, USSR). *Vrach. Delo* (12):24-30; 1977.

7600 TOBACCO SMOKING AND GASTRODUODENAL ULCERS. (Rus.) Vainshtein, S. G. (V. I. Lenin Kazan Inst. Advanced Training Physicians, Kazan, USSR). *Klin. Med. (Mosk.)* 56(3):11-18; 1978.

7601 DIAGNOSIS, MANAGEMENT, AND OUTCOME OF UPPER GASTROINTESTINAL HEMORRHAGE IN CHILDREN AND ADOLESCENTS [Abstract]. (Eng.) Cox, K. L.; Ament, M. E. (Dept. Pediatrics, Univ. California, Los Angeles, CA). *Clin. Res.* 26(2):173A; 1978.

7602 ANTRAL AND DUODENAL GASTRIN CELL MAS[illegible] GASTRECTOMY SPECIMENS FROM PATIENTS [illegible] PEPTIC ULCER [Abstract]. (Eng.) Keuppens, F.; Willems, G. (Gastro-Enterological Res. Unit, Vrije Universiteit Brussels, Brussels, Belgium). *Digestion* 16(1/2):212-213; 1977.

7603 SECRETIN-INDUCED LIBERATION OF GASTRIN AND NON-GASTRIN SECRETAGOGUE IN THE ZOLLINGER-ELLISON SYNDROME AND IN DUODENAL ULCER [Abstract]. (Eng.) Girodet, J.; Hervour, P.; Accary, J. P.; Mignon, M.; Dubrasquet, M.; Bonfils, S. (INSERM, U 10, Hopital Bichat, 75877 Paris Cedex 18, France) *Acta Hepatogastroenterol. (Stuttg.)* [illegible] 491; 1977.

7604 SERUM GASTRIN RESPONSE TO INSULIN AT HIGH INTRAGASTRIC pH BEFORE AND AFTER SELECTIVE VAGOTOMY FOR DUODENAL ULCER [Abstract]. (Eng.) Emas, S.; Dorner, M.; Kaess, H.; Lilja, B.; Svensson, S. O. (Karolinska Hosp., Stockholm, Sweden). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):482-483; 1977.

7605 CLINICAL AND SECRETORY CORRELATIONS OF VERY LONG-TERM TREATMENT WITH CIMETIDINE [Abstract]. (Eng.) Saunders, J. H. B.; Cargill, J. M.; Wormsley, K. G. (Ninewells Hosp., Dundee, Scotland). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):485; 1977.

7606 HYPERGASTRINEMIA AFTER VAGOTOMY RESPECTING ULCER RECURRENCE [Abstract]. (Eng.) Bauer, H.; Holle, F. (Chirurgische Poliklinik der Universitat Munchen, Munich, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):487; 1977.

7607 EFFECT OF 6 WEEKS OF CIMETIDINE TREATMENT ON PARIETAL AND CHIEF CELL SENSITIVITY TO PENTAGASTRIN STIMULATION [Abstract]. (Eng.) Aadland, E.; Berstad, A. (Aker Hosp., Oslo, Norway). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):488; 1977.

7608 H_2-RECEPTOR ANTAGONISTS. (Eng.) Siepler, J. K.; Campagna, K. D.; Donahue, P. E.; Bombeck, C. T. (Univ. Illinois, Medical Center, Chicago, IL 60680). *Am. J. Hosp. Pharm.* 35(2):141-145; 1978.

7609 CIMETIDINE: A REVIEW OF ITS PHARMACOLOGICAL PROPERTIES AND THERAPEUTIC EFFICACY IN PEPTIC ULCER DISEASE. (Eng.) Brogden, R. N.; Heel, R. C.; Speight, T. M.; Avery, G. S. (Australasian Drug Information Services, P.O. Box 34-030, Birkenhead, Auckland 10, New Zealand). *Drugs* 15(2):93-131; 1978.

7610 FATAL UPPER GASTROINTESTINAL BLEEDING IN AN 80-YR-OLD MAN. (Eng.) Bayless, T. M.; White, R. I.; Yardley, J. H. (Johns Hopkins Hosp., Baltimore, MD 21205). *Gastroenterology* 74(1):130-133; 1978.

7611 INHIBITION OF BASAL AND PENTAGASTRIN-STIMULATED GASTRIC ACID SECRETION AFTER TREATMENT WITH BENZILONIUM BROMIDE AND AFTER SELECTIVE PROXIMAL VAGOTOMY. (Eng.) Jaska, F. (Koping Hosp., S-731 01 Koping, Sweden). *Scand. J. Gastroenterol.* 12(6):695-699; 1977.

7612 CURRENT OPERATIONS FOR DUODENAL ULCER. (Eng.) Nyhus, L. M. (Univ. Illinois, Medical Center, Chicago, IL 60680). *Jpn. J. Surg.* 7(3):105-113; 1977.

7613 THERAPEUTIC USES OF CIMETIDINE. (Eng.) Thomson, T. J. (Stobhill General Hosp., Glasgow, Scotland). *Scott. Med. J.* 22(4):300-305; 1977.

7614 SYSTEMATIC FOLLOW-UP: A CONCEPT FOR EVALUATION OF OPERATIVE RESULTS IN DUODENAL ULCER PATIENTS. (Eng.) Rohde, H.; Troidl, H.; Lorenz, W. (Chirurgische Universitatsklinik, Robert-Koch-Str. 8, D-3550 Marburg/Lahn, W. Germany). *Klin. Wochenschr.* 55(19):925-932; 19

7615 EROSIVE GASTRITIS AND DUODENITIS DURING CONTINUOUS CIMETIDINE TREATMENT. (Eng.) Webster, J.; Petrie, J. C.; Mowat, N. A. G. (Dept. Therapeutics, Univ. Aberdeen, Aberdeen AB9 2ZD, Scotland). *Br. Med. J.* 1(6104):20-21; 1978.

7616 TREATMENT OF SEVERE SIDE EFFECTS AFTER VAGOTOMY AND GASTROENTEROSTOMY BY CLOSURE OF GASTROENTEROSTOMY WITHOUT PYLOROPLASTY. (Eng.) McMahon, M. J.; Johnston, D.; Hill, G. L.; Goligher, J. C. (General Infirmary, Leeds LS1 3EX, England). *Br. Med. J.* 1(6104):7-8; 1978.

7617 THE ESOPHAGUS IN PATIENTS WITH GASTRODUODENITIS AND PEPTIC ULCER DISEASE. (Eng.) DeLuca, V. A., Jr.; Sheahan, G. D. (Griff Hosp., Derby, CN 06418). *South. Med. J.* 71(Suppl. 1):52; 1978.

7618 POSTOPERATIVE RECURRENT PEPTIC ULCER: THE SIGNIFICANCE OF THE ZOLLINGER-ELLISON SYNDROME. (Eng.) Lusby, R. J.; Byrnes, D. J.; Hugh, T. B. (St. Vincent's Medical Center, 376 Victoria St., Darlinghurst, New South Wales 2010, Australia). *Med. J. Aust.* 2(12):389-391; 1977.

7619 SELECTIVE VAGOTOMY FOR DUODENAL ULCER: A FIVE-YEAR FOLLOW-UP. (Eng.) Couplan G. A. E.; Cumberland, V. H.; Lorang, M. E. (Royal North Shore Hosp. Sydney, St. Leonards, New South Wales 2065, Australia). *Med. J. Aust.* 2(12 386-388; 1977.

7620 ROLE OF ISCHAEMIA IN THE INITIATION OF PEPTIC ULCER. (Eng.) Piasecki, C. (Royal Free Hosp. Sch. Medicine, London, England) *Ann. R. Coll. Surg. Engl.* 59(6):476-478; 1977.

See also, 7352, 7378, 7506, 7524, 7525, 7541, 756
7567, 7573, 7575, 7631, 7911, 7920, 793

21 ENTEROKINASE ACTIVITY IN HUMAN INTESTINALIZED GASTRIC MUCOSA.

(Eng.) Simon,
; Figus, A. I. (Hospital Jaszbereny, H-5101 Jasz-
reny, Hungary). *Digestion* 16(1/2):48-50; 1977.

terokinase activity was examined in six homogen-
ed specimens of human gastric tissue with in-
stinal metaplasia, three specimens of normal
stric mucosa, and three specimens of normal du-
enal mucosa. Enterokinase activity was demonstra-
d in normal duodenal mucosa at a level of 34.3 ±
2 U/g mucosa, while no activity was found in the
rmal gastric mucosa. Enterokinase activity was
monstrated in the homogenate of intestinalized gas-
c mucosa (5.41 ± 2.11 U/g), and the level was in-
eased in homogenates of biopsy specimens taken 10
after the subjects had received an i.v. injection
1 mg of glucagon (8.28 ± 3.75 U/g, $p<0.01$). These
ervations support the hypothesis that intes-
alized brush border cells of gastric mucosa may
e the original absorptive and secretory capacity
true intestinal epithelium.

2 ABNORMAL DUODENAL LOOP AND PYLORIC REGURGITATION.

(Eng.) Thommesen, P. (Muni-
al Hosp., Aarhus, Denmark). *Acta Radiol.*
agn.] *(Stock.)* 18(4):473-479; 1977.

dies were carried out in 48 patients with
er abdominal dyspepsia to investigate whether
denal anomalies and posture have any influence
pyloric regurgitation and whether a parasym-
etic drug (metochlopramide) has any effect
the regurgitation. Eleven patients had a
nal duodenal loop, 14 had a proximal duodenal
maly and passage hindrance high in the duo-
um, and 23 had a distal anomaly or a short
denal loop or combined anomaly. A tube was
sed into the descending part of the duodenum,
20 ml of contrast medium was instilled.
roscopy and exposure of the films were carried
immediately and after 4 min. Pyloric regur-
ation occurred significantly more often in the
patients with a distal anomaly, short duodenal
p, or combined anomaly (19/23; $\chi^2=12.4$, 3.84 at
evel) than in the first group (2/11). No
lent difference was demonstrated between the
t and second groups; 5 of the 14 patients in
second group had regurgitation ($\chi^2=1.20$, 3.84
% level). Regurgitation occurred in 11 of 17
ents in an erect position but in none of these
ents when they were supine. Regurgitation in
erect position was more effectively prevented
etochlopramide (20 mg, i.v.) than by placebo
2 and 2/12, resp.; $\chi^2=4.61$, 3.84 at 5% level).
results suggest that a relation exists be-
n pyloric regurgitation, the shape of the
enal loop, and the position of the patient,
that metochlopramide has an effect on the
rgitation. Distal and combined anomalies and
ort duodenal loop predispose the patient to
ric regurgitation.

JEJUNAL DIVERTICULITIS.

(Eng.) Giustra, P. E.; Killoran, P. J.; Root, J. A.; Ward, W. W. (Penobscot Bay Medical Center, Rockland, ME 04841). *Radiology* 125(3):609-611; 1977.

The cases of two patients with jejunal diverticulitis are presented. Both patients exhibited episodes of partial small bowel obstruction, acute abdominal symptoms, abdominal masses, intermittent hypochromic anemia, and recurrent diverticulitis over several years. The first patient was a 50-yr-old man in whom jejunal diverticulitis was suggested on the basis of low-grade jejunal obstruction. He responded to medical treatment, but 4.5 yr later he developed signs of generalized peritoneal irritation. Abdominal radiographs showed dilated, fluid-filled loops of small intestine thought to be consistent with adynamic ileus caused by peritonitis. The clinical diagnosis was sigmoid diverticulitis, and the patient responded to antibiotic therapy and i.v. fluids. A subsequent barium enema study was negative for sigmoid diverticulitis, and a small bowel series demonstrated extravasation of barium from a ruptured jejunal diverticulum into a sealed-off mesenteric abscess. The other patient was a 79-yr-old woman with left upper quadrant abdominal pain and a firm, nontender, movable anterior left subcostal abdominal mass. A barium enema study showed a persistent localized contour abnormality of the inferior aspect of the distal transverse colon. An upper gastrointestinal series demonstrated jejunal diverticula, but they were not readily associated with the abnormal barium study. At surgery, a 1.5-cm jejunal diverticulum was found together with an inflammatory mass. The mass adhered to the colon, although the latter was not directly involved with the abscess. The mass and two adjacent jejunal loops were resected. There were also other small adjacent jejunal diverticula. Six years later, multiple diverticula of the jejunum with secondary diverticulitis and abscess formation were found at surgery. A 4-cm pus-filled abscess space forming an adhesive S-shaped mass binding segments of the jejunum together was demonstrated. In the event of future nonspecific acute or chronic abdominal findings, previous knowledge of jejunal diverticula might suggest a diagnosis of jejunal diverticulitis and lead to barium studies sooner than would otherwise be the case.

7624 INTRAMURAL HEMORRHAGE OF THE SMALL INTESTINE.

(Eng.) Eiland, M.; Han, S. Y.; Hicks, G. M., Jr. (Radiology Associates, 1717 11th Ave., S., Birmingham, AL 35205). *JAMA* 239(2):139-142; 1978.

The roentgenographic features, course, and treatment of intramural hemorrhage are discussed, and seven illustrative cases are presented. The patients included two on anticoagulation therapy and four hemophiliacs. The hemorrhage produced one of two sets of manifestations: those related to a localized intramural mass and those related to diffuse infiltration of the bowel wall. Preliminary films of the abdomen in patients with hematoma showed a mass density with displacement of adjacent bowel. Adynamic ileus was frequently seen, and in the affected areas that contained gas, narrowing of the lumen and scalloping or thumbprinting were seen. Barium studies usually showed segmental changes, and the affected bowel was rigid. The bowel loops were separated, and the lumen was narrow but not obstructed. There was uniform thickening of the folds, which were sharply demarcated. Their parallel arrangement gave a spike-like ("coil spring") appearance. This was most frequently seen in the jejunum, where valvulae were rarely effaced. Thumbprinting was frequently well demonstrated with barium studies. Transient intussusception was present in two patients. In two patients with no discrete intramural mass, thumbprinting and the coil spring appearance were present. All but one of the patients had resolution of signs and symptoms with conservative therapy.

7625 EOSINOPHILIC GASTROENTERITIS PRESENTING AS ILEOCOLITIS.

(Eng.) Haberkern, C. M.; Christie, D. L.; Haas, J. E. (Children's Orthopedic Hosp. and Medical Center, Seattle, WA 98101). *Gastroenterology* 74(5, Part 1):896-899; 1978.

The case of a patient with clinical and roentgenographic ileocolitis diagnosed as Crohn's disease who was subsequently found to have eosinophilic gastroenteritis with colonic involvement is presented. The patient was a 15-yr-old girl with nausea, vomiting, abdominal pain, diarrhea, and weight loss. The peripheral eosinophil count was 600/mm^3. Barium enema showed marked mucosal edema and thickening of the terminal ileum, cecum, and ascending and proximal transverse colon. The upper gastrointestinal series with small bowel follow-through revealed a normal stomach and bowel to the terminal ileum, which itself appeared abnormal with fixation and mucosal thickening. Colonoscopy showed an erythematous cecum, and biopsy showed a normal colonic epithelium. The patient responded to prednisone therapy, which was given for a presumptive diagnosis of Crohn's ileocolitis, but diarrhea persisted. Prednisone therapy was tapered 1 month after hospitalization, at which time a repeat upper gastrointestinal series showed a normal terminal ileum. After discontinuing therapy, the patient again developed abdominal complaints together with urinary tract symptoms. The peripheral eosinophil count was 400/mm^3. The upper gastrointestinal series showed prominent gastric antral folds along with bowel wall thickening from the duodenum through the ileum. At laparotomy, the ascitic fluid was found to be rich in eosinophils, and multiple full thickness biopsies revealed the following: diffuse eosinophilic infiltration of the muscularis and serosa of the stomach, duodenum, jejunum, ileum, and right colon; eosinophilic infiltration of the fibrous stroma separating bladder-wall muscle bundles; and eosinophilic infiltration of a mesenteric lymph node. The patient's symptoms responded to prednisone, hydralazine, nitrofurantoin, and antacid therapy for eosinophilic gastroenterocolitis, cystitis, and a duodenal ulcer.

7626 ACUTE FULMINATING TRANSMURAL ILEOCOLITIS AFTER SMALL BOWEL BYPASS FOR MORBID OBESITY.

(Eng.) Francis, W. W.; Iannuccilli, E. (110 Lockwood St., Providence, RI 02903). *Am. J. Surg.* 135(4):524-528; 1978.

Thirty-one patients who underwent small intestinal bypass for morbid obesity were followed up. Each patient underwent an end-to-end jejuno-ileostomy anastomosing 14 inches of proximal jejunum to 4 inches of terminal ileum. Complications included hepatic insufficiency (3 patients), urinary calcul (4), inadequate weight loss (6), metabolic acidosi (3), and severe diarrhea (5). The most unusual complication occurred in a 39-yr-old woman, whose case report is presented. She developed profuse diarrhea, abdominal cramps, fever, and a weight loss of 12 pounds in 1 week at 22 months postbypass. Before this time, she had apparently responded well to the operation, losing 132 pounds during the 22-month period. Microscopic examination of a resected segment of previously bypassed and diseased small bowel revealed findings consistent with Crohn's disease. Normal bowel continuity was re-established and the diseased small bowel was resected. The patient recovered, and weighs 195 pounds following surgery and steroid therapy.

7627 CHANGES IN PLASMA AND MUSCLE FREE AMINO ACIDS IN OBESE PATIENTS AFTER JEJUNOILEAL BYPASS.

(Eng.) Goldberger, J. H.; Cha, C. J.; Randall, H. T. (Rhode Island Hosp., Providenc RI). *Surg. Forum* 28:432-435; 1977.

The nutritional state of six obese patients who underwent jejunoileal bypass was assessed by analyzing changes in plasma and muscle cell free am acids. The preoperative plasma amino acid profiles were normal in all patients. Three months postoperatively, all essential amino acids, excep methionine, and most of the nonessential amino acids in the plasma were decreased. The decrease were statistically significant in the case of va ine ($p<0.05$), lysine ($p<0.05$), and cystine (p<0.0 Only glycine (22.7%) and, occasionally, serine i creased. Intracellular free leucine, valine, and isoleucine significantly decreased postoperativel (by 49.4%, 41.2%, and 32.8%, resp., $p<0.05$). Anserine also decreased (by 34.0%), with a suggest significance ($p<0.1$). The concentrations of serine, glycine, ornithine, histidine, methionine, taurine, threonine, and proline increased postoperatively (by 57.0%, 37.8%, 33.9%, 31.4%, 10.4 24.3%, 21.0%, and 14.7%, resp.), but statistical significance could not be demonstrated in this small series. These data suggest that there are significant differences in the change in concentrations of free amino acids between plasma and muscle in obese patients who have undergone a bypass procedure, and that changes in plasma amino acid composition is not necessarily relevant to muscle and probably not to the total amino acid pool.

7628 TRAUMATIC RETROPERITONEAL RUPTURE OF TH DUODENUM.

(Eng.) Vellar, D. J.; Vella I. D. A.; Pianta, R. M. (Essex County Hosp., Eng land). *Aust. N.Z. J. Surg.* 46(3):206-208; 1976.

cases of six patients with traumatic retro-
toneal duodenal rupture are presented. The
ry was associated with a car accident in three
es, with being struck by an automobile in one
, and with being struck in the abdomen in two
s. Abdominal examination revealed tenderness,
ding, and rigidity, and these signs were max-
in the lower abdomen rather than in the upper
men in three patients. Only one patient had
abnormality in the plain x-ray film of the
men; in this case, the right psoas shadow was
terated, which suggested the possibility of
enal rupture. Four patients showed sufficient
rmalities on repeated abdominal examination
ead to laparotomy within 12 hr of injury.
e was a 66-hr delay in surgery in one patient
use of severe skeletal injuries. This patient,
the four in whom surgery was carried out within
r, survived with surgical treatment. The re-
ing patient showed indefinite signs on abdom-
palpation, but 20 hr after the injury, florid
ralized peritonitis had set in, with accompany-
generalized rigidity, guarding, and tenderness.
peration, an i.v. pyelogram showed obvious gas
he retroperitoneal tissues. After the operation,
patient became hypotensive and anuric. He had
hemolysis, and many encapsulated *Clostridium*
ringens were discovered in the peritoneal fluid.
ied 20 hr after surgery. These cases illustrate
need for early diagnosis and treatment of this
type of abdominal trauma, and emphasize that
ated abdominal examinations should be carried
t hourly or 2-hourly intervals in patients
abdominal trauma.

PREOPERATIVE ANGIOGRAPHIC DIAGNOSIS OF SMALL BOWEL LEIOMYOMAS.

(Eng.) Stothert,
, Jr.; Riaz, M. A.; Joyce, P. F.; Kaminski, D.
ept. Surgery, St. Louis Univ., St. Louis, MO).
Surg. 113(5):643-645; 1978.

reoperative angiographic diagnosis of small
leiomyomas in two patients with gastrointes-
hemorrhage, the origin of which was not evi-
by more conventional diagnostic measures, is
ibed. The first patient was an 82-yr-old man
melena. Gastroscopy and barium enema examina-
were negative, and the barium enema examina-
delayed the ability to obtain arteriographic
es. A jejunal tumor, which proved to be a
yoma, was detected by the superior mesenteric
iogram. The second patient was a 44-yr-old
ho presented with colicky lower abdominal
and developed rectal bleeding. A bleeding
ticulum was strongly suspected. Sigmoid-
ic examination showed bleeding beyond the
of the instrument. Emergency visceral angio-
revealed a tumor in the ileal branches, sug-
g leiomyoma. Both patients did well after
mors were resected. The results in these
ts and a literature review suggest that the
raphic diagnosis of leiomyoma may be indi-
by the following criteria: well-circum-
d margins of tumor stain, prominent feeding
es and veins, irregular tumor vessels giving
o a dense stain, and small areas of pooling
trast material in the mass.

7630 SARCOMA OF THE SMALL AND LARGE INTESTINES: CLINICAL FEATURES, TREATMENT AND PROGNOSIS.

(Ger.) Ruckert, K.; Gronniger, J.; Brunner, H. (Chirurgische Universitatsklinik, Langenbeckstr. 1, 6500 Mainz, W. Germany). *Dtsch. Med. Wochenschr.* 102(45):1631-1634; 1977.

The clinical aspects, therapy, and prognosis of sarcomas of the small and large intestines are described in connection with 27 cases. The sarcoma was localized to the small intestine in 20 cases, to the colon in 5, and to the rectum in 2. Reticulosarcoma was diagnosed in 10 cases, leiomyosarcoma in 4, neurogenic sarcoma in 3, round cell sarcoma in 3, lymphosarcoma in 4, pleomorphic sarcoma in 1, and rhabdomyosarcoma in 2. Reduced health status, loss of weight, pains, intestinal bleeding, changes in defecation habits, fever, colics, palpable tumor, ileus, and peritonitis were the most frequent symptoms. The tumor was locally operable and without metastases in 6 cases, locally operable with metastases in 15, and inoperable with metastases in 6. Radical segment resection was performed in 14 cases, palliative surgery in 11, and exploratory laparotomy in 2. Two patients received postoperative radiotherapy and 14 received chemotherapy (9 patients received monochemotherapy with cyclophosphamide [6 patients], adriamycin, vincristine, or mitopodoside, and 5 received polychemotherapy with vincristine, 5-fluorouracil, methotrexate, cyclophosphamide, and prednylidene). The postoperative mortality was 30%; nine patients died from sarcoma during the 1st yr. Three patients (one with reticulosarcoma, another with neurogenic sarcoma of the small intestine, and a third with lymphosarcoma of the large intestine) have been recurrence-free for 2 yr, one patient with reticulosarcoma of the small intestine has been recurrence-free for 5 yr, one with leiomyosarcoma of the small intestine has been recurrence-free for 6 yr, and one patient with round cell sarcoma of the large intestine and another with lymphosarcoma of the small intestine have been recurrence-free for 12 and 17 yr, resp.

7631 JEJUNAL ENDOCRINE TUMOUR COMPOSED OF SOMATOSTATIN AND GASTRIN CELLS AND ASSOCIATED WITH DUODENAL ULCER DISEASE.

(Eng.) Alumets, J.; Ekelund, G.; Hakanson, R.; Ljungberg, O.; Ljungqvist, U.; Sundler, F.; Tibblin, S. (Dept. Histology, Univ. Lund, Lund, Sweden). *Virchows Arch. [Pathol. Anat.]* 378(1):17-22; 1978.

The case of a patient with a malignant jejunal endocrine tumor associated with severe duodenal ulcer is presented. The tumor and a local metastasis were examined immunohistochemically. The tumor and the lymph node metastasis, located in the mesentery, were similar, composed of nests and trabecules of cells with weakly stained cytoplasm. Numerous somatostatin-immunoreactive cells were found in both the tumor and the metastasis, with less numerous cells that displayed gastrin immunoreactivity. This is the first reported case of intestinal somatostatinoma. The presence of gastrin cells in the tumor may explain the ulcer diathesis.

7632 EFFECT OF STEROIDS ON PATIENTS WITH POSTOPERATIVE BOWEL ANASTOMOTIC DYSFUNCTION. (Eng.) Toledo-Pereyra, L. H.; Guzman, I.; Yonehiro, E. G. (Henry Ford Hosp., 4011 E&R Building, 2799 W. Grand Blvd., Detroit, MI 48202). *Henry Ford Hosp. Med. J.* 25(4):285-292; 1977.

7633 FUNCTIONAL LYMPHANGIECTASIA OF THE DUODENAL MUCOSA. (Eng.) Femppel, J.; Lux, G.; Kaduk, B.; Roesch, W. (Med. Univ.-Klinik, Krankenhaustr. 12, Erlangen, W. Germany). *Endoscopy* 10(1):44-46; 1978.

7634 JEJUNOILEAL BYPASS SURGERY AND GRANULOMATOUS DISEASE OF THE KIDNEY AND LIVER. (Eng.) Sweet, R. M.; Smith, C. L.; Berkseth, R. O.; Crosson, J. T.; Wathen, R. L. (Hennepin County Medical Center, Minneapolis, MN). *Arch. Intern. Med.* 138(4):626-627; 1978.

7635 PARAGANGLIONEUROMA OF THE DUODENUM: AN EVOLUTIONARY HYBRID? (Eng.) Cooney, T.; Sweeney, E. C. (Sch. Pathology, Trinity Coll., Dublin, Ireland). *J. Clin. Pathol.* 31(3):233-244; 1978.

7636 INTRALUMINAL DUODENAL DIVERTICULUM: REPORT OF A CASE INVESTIGATED BY FIBEROPTIC ENDOSCOPY. (Eng.) Mathieu, B.; Salducci, J.; Remacle, J. P.; Pin, G.; Monges, H. (Hopital Nord, 13326 Marseille Cedex 3, France). *Am. J. Dig. Dis.* 23(5, Suppl.):1S-5S; 1978.

7637 IUD GANGRENE OF SMALL INTESTINE. (Eng.) Barranco, C. J. (855 Front Ave., Salamanca, NY 14779). *Am. J. Surg.* 135(5):717; 1978.

7638 MECHANICAL SMALL BOWEL OBSTRUCTION DUE TO ADHESIONS. (Eng.) Ulvik, N. M.; Qvigstad, E. (Akershus Central Hosp., Norbyhagen, Norway). *Ann. Chir. Gynaecol.* 67(1):13-16; 1978.

7639 DISSEMINATED HISTOPLASMOSIS ORIGINATING FROM INTESTINAL LESIONS. (Eng.) Makoui, C.; Barritt, A. S., III (Veterans Admin. Hosp., Salem, VA 24153). *Am. J. Dig. Dis.* 23(5, Suppl.):87S-91S; 1978.

7640 BIZARRE LEIOMYOBLASTOMA OF JEJUNUM AS A CAUSE OF FEVER OF UNKNOWN ORIGIN. (Eng.) Rabau, M. Y.; Kissin, E.; Wolfstein, I.; Rosenthal, T. (Chaim Sheba Medical Center, Tel Hashomer, Israel). *Am. J. Dig. Dis.* 23(5, Suppl.):84S-86S; 1978.

7641 PORTAL VENOUS OCCLUSION: AN UNUSUAL CAUSE OF ASCITES IN A PATIENT WITH JEJUNOILEAL BYPASS. (Eng.) Metz, R.; Gray, R.; Goldstein, L. (Univ. California at Los Angeles Center Health Sciences, Los Angeles, CA 90024). *Am. J. Dig. Dis* 23(5, Suppl.):59S-61S; 1978.

7642 FATTY ACID ENTEROLITHS AND INTERMITTENT SMALL INTESTINAL OBSTRUCTION. (Eng.) Hosler, J. P.; Hartong, W. A.; Moeller, D. D. (Kansas Univ. Medical Center, Rainbow Blvd. at 39th St., Kansas City, KS 66103). *Am. J. Dig. Dis* 23(5, Suppl.):28S-32S; 1978.

7643 THE VALUE OF EMERGENCY ANGIOGRAPHY IN TH DIAGNOSIS AND PROGNOSIS OF ACUTE MESENTE ARTERIAL INSUFFICIENCY. (Eng.) Carrasco, D.; Gordo, R.; Olaso, V.; Baguena, J.; Berenguer, J. (La Fe Hosp., Av. Alferez Provisional, 21, Valenci 9, Spain). *Am. J. Gastroenterol.* 69(3, Part 1): 295-301; 1978.

7644 CONGENITAL DUODENAL STENOSIS: THE DUODE CERVIX SIGN. (Eng.) Halko, M.; LoPrest P. A.; Patel, H. D.; Chawla, S.; Marzulli, V. (Catholic Medical Center of Brooklyn & Queens, 88-25 153rd St., Jamaica, NY 11432). *Am. J. Gastr enterol.* 69(3, Part 1):323-327; 1978.

7645 SMALL BOWEL REVERSAL PROCEDURE FOR TREA MENT OF THE "SHORT GUT" BABY. (Eng.) Warden, M. J.; Wesley, J. R. (Kaiser Permanente Medical Center, 1526 N. Edgemont, Los Angeles, CA 90027). *J. Pediatr. Surg.* 13(3):321-323; 1978.

7646 ADENOMA OF DUODENAL GLANDS AS THE SOURC OF INTESTINAL HEMORRHAGE. (Rus.) Zubo N. A.; Artemova, L. F.; Zaitseva, L. N. (Dept. Patho-anatomy, Sverdlovsk Medical Inst., Sverdlov USSR). *Khirurgiia (Mosk.)* (10):125; 1977.

7647 ERRORS IN THE DIAGNOSIS OF NONEPITHELIA BENIGN TUMORS OF THE SMALL INTESTINE. (Rus.) Nazarov, V. G.; Dubovik, N. T.; Belov, V. (Municipal Clinical Oncological Dispensary, Novokuznetsk, USSR). *Khirurgiia (Mosk.)* (10):98-99; 1977.

7648 SMALL INTESTINAL CARCINOMA COMPLICATED BY PROFUSE INTESTINAL HEMORRHAGE. (Rus Zaporozhets, V. K.; Chupryna, V. V. (Surgical Cli ic, Voroshilovgrad Medical Inst., Voroshilovgrad, USSR). *Khirurgiia (Mosk.)* (10):126-127; 1977.

7649 MELANOMA OF THE SMALL INTESTINE. (Rus. Iakushin, V. I.; Danilin, A. A. (S. P. Botkin Clinical Hosp., Moscow, USSR). *Khirurgii (Mosk.)* (10):127-128; 1977.

7650 COMPLICATED JEJUNAL DIVERTICULOSIS. (Fre.) Baulieux, J.; Boulez, J.; Mignotte, H.; Maillet, P. (Hopital de la Croix-Rous

17 Lyon Cedex 1, France). *Lyon Chir.* 73(5):
-376; 1977.

THERAPY OF OBESITY BY SMALL INTESTINAL
SHUNT OPERATION? (Ger.) Forster, H.
ntrum der Biologischen Chemie der Universitat,
odor-Stern-Kai 7, 6 Frankfurt/M. 70, W. Germany).
tschr. Med. 95(36):2199-2202; 1977.

ACUTE OCCLUSION OF THE SMALL INTESTINE
BY IATROGENIC INTERNAL HERNIA. (Fre.)
on, C.; Vacca, C.; Piulachs, J. (No affiliation
n). *Rev. Fr. Gastroenterol.* (130):7-13; 1977.

7653 ERRORS IN THE DIAGNOSIS OF INTESTINAL PERFORATION CAUSED BY FISH BONES. (Rus.) Nechiporuk, V. M.; Ostrovskii, V. P. (Faculty Pediatrics, N. I. Pirogov Vinnitsa Medical Inst., Vinnitsa, USSR). *Klin. Khir.* (10):75-77; 1977.

See also, 7272, 7449, 7454, 7463, 7474, 7475, 7476, 7478, 7479, 7492, 7507, 7508, 7510, 7566, 7573, 7577, 7578, 7579, 7584, 7598, 7615, 7617, 7659, 7667, 7685, 7721, 7915, 7916, 7919, 7925, 7929, 7930, 7935, 7936, 7946, 7947, 7954, 7955, 7957, 7958, 7959, 7960.

SMALL INTESTINE

Malabsorption

INCREASED TISSUE CONCENTRATIONS OF 5-HY-
DROXYTRYPTAMINE IN THE DUODENAL MUCOSA
ATIENTS WITH COELIAC DISEASE. (Eng.) Challa-
e, D. N.; Dawkins, P. D.; Baker, P. (Taunton
Somerset Hosp., Taunton, Somerset, England).
18(11):882-886; 1977.

nvestigate the relationship between the hyper-
vity or hyperplasia of enterochromaffin (EC)
s in the duodenum and the abnormalities of
droxytryptophan (5-HT) metabolism in celiac
ase, tissue levels of 5-HT were estimated in
uodenal mucosa of four adults and seven
ren with untreated celiac disease. The
ts were compared with a control group of four
s and six children with normal duodenal mu-
by light microscopy. The wet weight of duo-
tissue and its protein content were not
ficantly different in the patients and con-
. Tissue concentrations of 5-HT related
r to tissue weight or to tissue protein
significantly higher ($p<0.001$) in patients
celiac disease than in controls (10.8 ± 4.0
s 4.2 ± 2.0 μg 5-HT/g tissue or 144.5 ± 39.8
s 55.3 ± 17.9 μg 5-HT/g tissue protein).
were no significant differences between the
s and children in each group. When three
ren with celiac disease were challenged p.o.
gluten powder (10 g t.i.d. for 10 days),
tissue 5-HT concentrations rose from pre-
enge values similar to those of the control
nts to postchallenge values that were much
r, and the severity of duodenal histopatho-
al changes increased. Further studies will
quired to determine whether the raised tissue
s of 5-HT are due to hyperplasia or to hyper-
ity of EC cells or to both.

7655 CORRECTION OF COBALAMIN MALABSORPTION IN PANCREATIC INSUFFICIENCY WITH A COBALAMIN ANALOGUE THAT BINDS WITH HIGH AFFINITY TO R PROTEIN BUT NOT TO INTRINSIC FACTOR: IN VIVO EVIDENCE THAT A FAILURE TO PARTIALLY DEGRADE R PROTEIN IS RESPONSIBLE FOR COBALAMIN MALABSORPTION IN PANCREATIC INSUFFICIENCY. (Eng.) Allen, R. H.; Seetharam, B.; Allen, N. C.; Podell, E. R.; Alpers, D. H. (Washington Univ. Sch. Medicine, St. Louis, MO 63110). *J. Clin. Invest.* 61(6):1628-1634; 1978.

The hypothesis that the etiology of cobalamin (Cbl) malabsorption in pancreatic insufficiency is an inability to partially degrade R protein because of a lack of pancreatic proteases was tested by determining the ability of a nonradioactive Cbl analogue, bound with high affinity by R protein but not by intrinsic factor (IF), to correct the malabsorption of ^{57}Co-Cbl in three patients with pancreatic insufficiency. R protein bound the Cbl analogue known as cobinamide with affinities that were the same and only 14-fold lower than those for Cbl at pH 8 and pH 2, resp. Cobinamide was bound by IF with affinities that were 600,000- and 10,000-fold lower than those for Cbl at pH 8 and 2, resp. The addition of 125 pmol of nonradioactive cobinamide to 0.5 pmol of ^{57}Co-Cbl before being added to 1 pmol of R protein and 1 pmol of IF, markedly inhibited the ability of R protein to compete with IF for binding the ^{57}Co-Cbl. Similar results were obtained with freshly aspirated gastric juice. This change was essentially indistinguishable from that observed previously when R protein or R protein-^{57}Co-Cbl was incubated *in vitro* with trypsin. The p.o. administration of 100 nmol of nonradioactive cobinamide in Schilling tests was equivalent to trypsin in its ability to completely correct the malabsorption of 0.4 nmol of ^{57}Co-Cbl in the three patients with pancreatic insufficiency. The fact that both trypsin and nonradioactive cobinamide inhibit the ability of R protein to compete with IF for ^{57}Co-Cbl binding *in vitro*, and correct the malabsorption of ^{57}Co-Cbl in patients with pancreatic insufficiency *in vivo*, supports the hypothesis that the primary defect in Cbl absorption in this disease is an inability to partially degrade R protein because of a lack of pancreatic proteases.

7656 MUCOSAL RECOVERY IN TREATED COELIAC DISEASE [Abstract]. (Eng.) McNicholl, B.; Egan-Mitchell, B.; Fottrell, P. F. (No affiliation given). *Acta Paediatr. Belg.* 29(2):133; 1976.

7657 HISTOCHEMICAL EXAMINATION OF JEJUNAL GAMMA-GLUTAMYLTRANSPEPTIDASE (GGTP) ACTIVITY IN COELIAC DISEASE [Abstract]. (Eng.) Zalewski, T.; Wozniewicz, B.; Radzikowski, A.; Klos, J. (No affiliation given). *Acta Paediatr. Belg.* 29(2):135; 1976.

7658 HYPOVITAMINOSIS K IN COELIAC DISEASE. (Eng.) Rodesch, P.; Cadranel, S.; Winckler, M.; Loeb, H. (Hopital Saint-Pierre, Rue Haute, 320 B-1000 Bruxelles, Belgium). *Acta Paediatr. Belg.* 29(3):123-124; 1976.

7659 "TYPE 3" BILE ACID MALABSORPTION AND DIARRHEA--EVIDENCE FOR A NEW CLINICAL ENTITY [Abstract]. (Eng.) Fromm, H.; Farivar, S.; McJunkin, B. (Dept. Medicine, Univ. Pittsburgh, Pittsburgh, PA). *Gastroenterology* 72(5, Part 2):1060; 1977.

7660 LACTOSE MALABSORPTION IN ADULT VIETNAMESE (Eng.) Nong The Anh; Tran Kiem Thuc; Welsh, J. D. (Univ. Hosp. and Clinics, P.O. Box 25606, Oklahoma City, OK 73125). *Am. J. Clin. Nutr.* 30(4):468-469; 1977.

7661 LACTOSE MALABSORPTION IN MEXICAN-AMERICAN ADULTS. (Eng.) Woteki, C. E.; Weser, E. Young, E. A. (Dept. Nutrition and Food, Drexel Univ Philadelphia, PA). *Am. J. Clin. Nutr.* 30(4):470-475; 1977.

7662 EFFECTS OF AGE ON LACTOSE MALABSORPTION IN OKLAHOMA NATIVE AMERICANS AS DETERMIN BY BREATH H_2 ANALYSIS. (Eng.) Caskey, D. A.; Payne-Bose, D.; Welsh, J. D.; Gearhart, H. L.; Nance, M. K.; Morrison, R. D. (Dept. Food, Nutriti and Inst. Admin., Oklahoma State Univ., Stillwater OK 74074). *Am. J. Dig. Dis.* 22(2):113-116; 1977.

See also, 7946, 7917, 7946, 7955.

LARGE INTESTINE

7663 A RANDOMIZED PROSPECTIVE EVALUATION OF ORALLY ADMINISTERED ANTIBIOTICS IN OPERATIONS ON THE COLON. (Eng.) Vargish, T.; Crawford, L. C.; Stallings, R. A.; Wasilauskas, B. L.; Myers, R. T. (Bowman Gray Sch. Medicine, Winston-Salem, NC). *Surg. Gynecol. Obstet.* 146(2):193-198; 1978.

The usefulness of orally administered antibiotics in the preoperative preparation of the intestine was investigated in colon specimens from 91 patients who underwent 3 days of mechanical preparation of the intestine and who were given one of three antibiotic groups the day before operation: neomycin and erythromycin base (NE), neomycin-phthalylsulfathiazole (NP), or neomycin (control, N). There were no significant differences among the three groups in terms of the types of operations performed. The baseline for comparison was established using samples from unprepared colon: 10^4-10^5 organisms/0.1 g tissue. By this standard 6/91 treated colons were bacteriologically unprepared (3 in the N group, 2 in the NE group, and 1 in the NP group), 25/91 colons were sterile (<10 organisms/0.1 g tissue; 10 in N, 10 in NE, and 5 in NP), and 60/91 were bacteriologically pr pared (10-10^3 organisms/0.1 g tissue, with no sig nificant differences among the groups). There was no association of any significant postoperati complication with any specific antibiotic preparation. The incidence of postoperative diarrhea was <7% and correlated better with the operative procedure than with the preoperative antibiotic. The wound infection rate ranged from 10% in the NE group to 12.5% in the N group, and these rates are extremely close to published national average

erations on the colon. The wound infections
ed in patients with bacteriologically pre-
colons, and 60% of them involved organisms
absent from the colon or present below
unting resolution (<10/0.1 g tissue) at the
f operation, indicating that adequate tissue
of the antibiotics had not been reached.
concluded that, while p.o. antibiotic
provides adequate intestinal antisepsis,
is possibly an advantage to parenteral
otic therapy in preparation for operations
adequate tissue antisepsis is desirable.

NEONATAL SMALL LEFT COLON SYNDROME. (Eng.)

Stewart, D. R.; Nixon, G. W.; Johnson, D.
don, V. R. (Univ. Kansas Medical Center, 39th
nbow Blvd., Kansas City, KS 66103). *Ann.*
86(6):741-745; 1977.

e reports, clinical findings, course, radio-
findings, pathology, and treatment of four
s with the neonatal small left colon syn-
SLCS) are presented. All infants had a
suggesting a low intestinal obstruction
the first 24-48 hr after birth. Three were
diabetic mothers who had toxemia or poly-
ios during pregnancy. These three infants
sistant fetal circulation syndrome hypo-
a and cyanosis shortly after birth. The
onal age of the four infants was between
40 weeks, and their weights ranged between
nd 4,500 g. Abdominal distention was pre-
nd the spontaneous passage of meconium was
. Plain abdominal roentgenograms showed
bowel in all four cases, and a pneumo-
eum was present initially in two cases.
enema examination showed a colon of sig-
tly reduced caliber from the anus to the
flexure, and there was generally a transi-
ne at the splenic flexure; this zone
ger than the one seen with Hirschsprung's
The colon proximal to the transition
dilated and distended with meconium. In
stance, the entire colon was readily filled.
gic examination in one patient showed an
ed ratio of small cells to multipolar gan-
lls. Three patients were operated upon be-
the presence of a pneumoperitoneum. Two
patients had cecal perforation, and both
symptoms of heart disease shortly after
The third patient had multiple ileal
ions in a marginally viable ileum. The
portion was excised and an ileostomy was
e patient survived. The fourth patient
omplications, and passed normal stools
g a second barium enema. These observa-
ggest that SLCS is not a benign disease
it can be fully cured by radiographic
enemas if detected early.

ABDOMINAL SCINTIPHOTOGRAPHY WITH
^{99m}TECHNETIUM-LABELLED ALBUMIN IN ACUTE
TESTINAL BLEEDING: AN EXPERIMENTAL STUDY

078

AND A CASE REPORT.

(Eng.) Miskowiak, J.; Munck, O.; Nielsen, S. L.; Andersen, B. (Bispebjerg Hosp., Bispebjerg Bakke, DK-2400 Copenhagen, Denmark). *Lancet* 2(8043):852-854; 1977.

A new diagnostic method for the detection of the bleeding site in acute gastrointestinal bleeding is described, and the method was tested in five volunteers and in one patient with acute bleeding. ^{99m}Technetium-labeled human serum albumin (1 mCi) is injected i.v., and the distribution of radioactivity in the abdomen is followed for 40 to 60 min by sequential scintiphotography. The site of simulated gastrointestinal bleeding was identified in all five volunteers. In the patient, a 91-yr-old man with severe bleeding from diverticula of the sigmoid colon, the method gave a correct estimate of the bleeding site and of its bleeding rate. These preliminary results suggest that this quick, noninvasive, easy technique may be useful in the diagnosis of gastrointestinal bleeding.

7666 VASCULAR DYSPLASIA OF THE RIGHT COLON: AN IMPORTANT CAUSE OF UNEXPLAINED GASTROINTESTINAL BLEEDING.

(Eng.) Broor, S. L.; Parker, H. W.; Ganeshappa, K. P.; Komaki, S., Dodds, W. J. (Medical Coll. Wisconsin, Milwaukee, WI). *Am. J. Dig. Dis.* 23(1):89-92; 1978.

The case of a 73-yr-old man with vascular dysplasia of the right colon is presented to emphasize the problems in diagnosis and discuss the value of different diagnostic methods as revealed in the literature for patients with chronic lower-gastrointestinal hemorrhage. The patient had a 3-yr history of frequent, intermittent black stools and occasional bright red blood in the stools, but there was no history of hematemesis, abdominal pain, anorexia, weight loss, or excessive alcohol consumption and no family history of any bleeding diasthesis. Numerous stool specimens were strongly guaiac-positive. The only other abnormal findings in routine studies were several diverticula of the left colon (by barium enema and pneumocolon examinations) and a small hiatal hernia (by roentgenographic examination of the upper gastrointestinal tract and a small bowel series). However, colonoscopic findings (a 2-cm in diameter, flat, reddish area in the ascending colon with irregular prominent blood vessels) and arteriographic findings (an area of irregular blood vessels in the upper ascending colon with early venous filling) were considered typical of vascular dysplasia. At laparotomy, a right hemicolectomy was performed, and the patient was well at 9-month follow-up. In chronic lower gastrointestinal hemorrhage, routine diagnostic studies may fail as much as 50% of the time, and negative findings at laparotomy may occur in as many as 70% of the cases. Arteriography and colonoscopy are extremely valuable diagnostic tools, especially in cases of vascular dysplasia, which are seldom within sigmoidoscopic reach and in which barium enema is often negative. The possibility of vascular dysplasia should be considered in any patient with chronic, obscure lower gastrointestinal bleeding.

7667 INTRALUMINAL CALCIFICATIONS IN THE SMALL BOWEL OF NEWBORN INFANTS WITH TOTAL COLONIC AGANGLIONOSIS.

(Eng.) Fletcher, B. D.; Yulish, B. S. (Univ. Hosp. Cleveland, University Circle, Cleveland, OH 44106). *Radiology* 126(2):451-455; 1978.

The cases of four neonates with total colonic aganglionosis in whom intraluminal calcifications were found in the small bowel are presented. Abdominal radiography demonstrated circular aggregations of small punctate calcific densities in the right lower quadrant and evidence of bowel obstruction. There was a microcolon in each case. The calcifications resembled those seen in small intestinal atresia and stenosis and are probably related to fetal intestinal stasis. Since in the 11 previously reported cases of intraluminal small intestinal calcifications the obstruction was not associated with meconium ileus or cystic fibrosis, intraluminal small bowel calcifications are likely to be associated with either small bowel atresia or total colonic aganglionosis.

7668 PSEUDOMEMBRANOUS COLITIS: PRESENCE OF CLOSTRIDIAL TOXIN.

(Eng.) Larson, H. E.; Price, A. B. (Clinical Res. Center, Watford Rd., Harrow, Middlesex HA1 3UJ, England). *Lancet* 2(8052/8053):1312-1314; 1978.

To identify the toxin involved in pseudomembranous colitis (PMC), the feces of 9 patients with histologically-proven PMC were studied and compared with results of similar studies in 18 other patients with other bowel diseases. Five of 9 and 2 of 18 patients had recently been treated with one or more of the antibiotics lincamycin, clindamycin, and ampicillin. A toxin was found in 9/9 PMC patients and in the 2/18 with antibiotic-associated nonspecific colitis; it was neutralizable by *Clostridium sordelli* antitoxin (detectable to titers of 1/100 or greater except for one case at 1/10,000) but not by gas gangrene antitoxin (a commercial preparation of *C. welchii*, *C. edematiens*, and *C. septicum* antitoxins), but the effect was morphologically different in the latter 2 patients. The tissue culture cytopathic effect (CPE) was produced by fecal extracts from all 11 patients and was neutralized in all cases by *C. sordelli* antitoxin; gas gangrene antitoxin did not neutralize the effect in the 9 PMC patients. When guinea pigs were inoculated with extracts from the feces of two PMC patients (tissue culture titers of 1/256 and 1/10,000), the results were comparable to those reported to follow inoculation with *C. sordelli* culture filtrates: the extract of lower titer produced a transient local edema; the more potent extract produced a massive, gelatinous, s.c. edema over the entire abdominal wall; and these animals died in 5-8 days after progressive weight loss and weakness. The PMC fecal toxin extract and *C. sordelli* extract both produced characteristic toxic CPE when inoculated into cultures of M.R.C. V cells. PMC fecal toxin was inactivated by heating at 56 C for 30 min, by incubation at pH 4 for 24 hr, and by incubation with specific antitoxin for 1 hr. These results compare well with previously obtained results for *C. sordelli* toxin. The results indicate that a specific clostridial toxin is closely associated
with PMC and that it is similar to *C. sordelli* in
many of its *in vivo* and *in vitro* properties.

7669 VALUE OF COLOSCOPY IN THE DETECTION OF SIGMOID MALIGNANCY IN PATIENTS WITH DIVERTICULAR DISEASE.

(Eng.) Glerum, J.; Agenant,
D.; Tytgat, G. N. (Wilhelmina Gasthuis, Eerste
Helmersstraat 104, Amsterdam Oud-West, Netherlands
Endoscopy 9(4):228-230; 1978.

The contribution of coloscopy to the diagnosis of
sigmoid carcinoma in 52 patients with diverticula
disease was evaluated. Coloscopy in 30 diverticu
disease patients without suspicion of malignancy
demonstrated diverticulosis/diverticulitis in 19
patients, diverticulosis plus polyp in 4, malig-
nancy in 2, and extrinsic compression in 2; the d
eased segment was not reached in 3 patients. Co-
loscopy in 22 diverticular disease patients sus-
pected of having co-existing malignancy of the si
moid colon revealed carcinoma in 10 patients, di-
verticulosis/diverticulitis in 3, diverticulosis
plus polyp in 1, and benign stenosis after resect
in 2; the disease segment was not reached in 6 pa
tients. Malignancy was subsequently demonstrated
by radiology in the two patients with stenosis af
resection and at surgical exploration in one of t
six patients suspected of having co-existing mali
nancy but not reached by coloscopy. There were n
false-positive or -negative cases. The results
demonstrate that coloscopy is useful for reaching
a correct diagnosis when concomitant malignancy o
the sigmoid colon is suspected in diverticular di
ease patients.

7670 SOLITARY DIVERTICULUM OF THE CAECUM AND ITS COMPLICATIONS.

(Eng.) Peltokallio
P.; Tykka, H.; Myllarniemi, H. (Second Dept. Sur-
gery, Univ. Helsinki, SF-00290 Helsinki 29, Finla
Ann. Chir. Gynaecol. 66(5):230-233; 1977.

The case reports of three patients with cecal div
ticula are presented. The patients were all men,
and two were younger than those usually having di
ticulitis of the colon (30 and 38 yr, resp.).
Acute appendicitis had been diagnosed preoperati
in all three cases in view of the symptoms, clin
findings, and laboratory findings. At laparotomy
the appendix was normal in each case. In the fi
patient, the diverticulum was situated 1 cm from
base of the appendix and was completely necrotic.
It was perforated and contained a fecolith, which
was probably responsible for the inflammation se
The diverticulum in the second patient was locat
4 cm from the base of the appendix on the latera
wall of the cecum. The third patient had a dive
ticulum surrounded by a large inflammatory, necr
mass. The diverticula were excised, and the mas
removed with a right-sided hemicolectomy. In vi
of the possibility that carcinoma may complicate
these diverticula, the authors support an aggres
approach to the treatment of inflammatory masses
the cecal wall.

NECROTIZING ENTEROCOLITIS (ISCHEMIC EN-
TEROPATHY) WITH THE SEQUEL OF COLONIC
SIA. (Eng.) Beardmore, H. E.; Rodgers, B. M.;
rbridge, E. (Montreal Children's Hosp., Mon-
l, Quebec, Canada). *Gastroenterology* 74(5,
1):914-917; 1978.

cases of acquired colonic atresia subsequent to
otizing enterocolitis (ischemic enteropathy) in
neonatal period are reported. The first pa-
t, a boy born at 33 weeks gestation, developed
toms of necrotizing enterocolitis at 5 days of
The patient had extensive gas in the bowel
and subsequently developed pneumoperitoneum.
aparotomy, extensive peritonitis was encountered
a perforation of the distal ileum. The dis-
d distal 10 cm of ileum and right colon were
cted, and an ileostomy was created. The patient
n tolerating p.o. alimentation, and a second
rotomy was performed with the intention of re-
ing intestinal continuity 11 weeks later. At
time, two areas of obstruction were found in
colon. A segment of proximal colon was re-
ed and showed marked edema and submucosal fi-
is consistent with previous neonatal ischemic
ropathy. A revision of the ileostomy and mu-
fistula was undertaken, and at 8 months of
a subtotal colectomy and ileoproctostomy was
ormed. The second patient, a boy born at 30
s of gestation, developed symptoms of necro-
ng enterocolitis on the day of birth. An ab-
nal radiograph revealed extensive pneumatosis
stinali with air within the portal venous sys-
Free air was also noted in the peritoneal
ty. At laparotomy, he was found to have se-
peritonitis and terminal ileal perforation.
terminal 12 cm of ileum and right colon were
cted, and an ileostomy was carried out. At 8
s of age, an ileotransverse colostomy was per-
ed, but the patient failed to pass stools per
um. Complete atresia of the colon in the re-
of the splenic flexure was encountered. An
descending colostomy was performed. Recogni-
of colonic atresia and other late sequelae
schemic enterocolitis becomes critical to the
essful outcome of these patients as survival
s increase.

ANORECTAL MYECTOMY IN TREATMENT OF ULTRA-
SHORT SEGMENT HIRSCHSPRUNG'S DISEASE:
RT OF 26 CASES. (Eng.) Scobie, W. G.; Mac-
ay, G. A. (Western General Hosp., Crewe Rd.,
burgh EH4 2XU, Scotland). *Arch. Dis. Child.*
):713-715; 1977.

rience with 140 children (ages 6 months-14 yr)
he period 1971-75 who were investigated for
tipation and soiling is presented. All chil-
had had chronic constipation from the 1st yr
ife; 35% had had continuous soiling. All were
stigated by anorectal manometry; 26 failed to
an inhibition response to rectal dilatation,
esting Hirschsprung's disease, and were treated
norectal myectomy. In 24 of the 26, the dis-
was confirmed histologically; 2 specimens
diagnostically unsuitable. In 21 myectomy
specimens, large abnormal nerve bundles and the absence of ganglion cells were found; 9/21 were totally aganglionic while 12/21 showed normal ganglia or a transitional zone of scattered ganglia at the upper end. Four required repeat myectomies to get above the aganglionic zone, with myectomy repeated twice in two. Three patients required anterior resection. In five myectomy specimens, large nerve bundles and muscle hypertrophy were seen. At follow-up, no patient was soiling, 17 patients achieved normal regular bowel movements after the initial myectomy, and the remaining 9 had normal function after repeat procedures. A diagnosis of Hirschsprung's disease should be considered in children with chronic constipation. An accurate neonatal history of bowel function and testing of anorectal pressure will aid the diagnosis. Anorectal myectomy is a simple procedure, often free of complications, that can be combined with anterior resection when the length of affected segment is too long for myectomy alone; these procedures offer effective palliation.

7673 PNEUMATOSIS CYSTOIDES COLI. (Eng.) Marshak, R. H.; Lindner, A. E.; Maklansky, D. (Mt. Sinai Sch. Medicine, City Univ. New York, New York, NY). *Gastrointest. Radiol.* 2(2):85-89; 1977.

The pathology, clinical features, roentgenographic features, and differential diagnosis of pneumatosis cystoides coli are reviewed. If the cysts are subserosal in location they are visible in the unopened specimen. On section, the bowel wall is honeycombed with gas cysts. The cysts are most often lined by a layer of endothelial cells. Diseases associated with pneumatosis cystoides coli include collagen disease, diabetes, colonic ischemia, inflammatory bowel disease, traumatic endoscopy, and polyp excision. Pneumatosis may be discovered as an incidental finding during examination for some other illness or abdominal cramps, diarrhea, and rectal bleeding may occur. Plain abdominal films may reveal grape-like radiolucent clusters along the contour of the colon and in the region of the mesentery. The clusters of air associated with pneumatosis cystoides coli can be readily distinguished from gas in abscess cavities because in pneumatosis there are discrete, sharply defined borders, and the cysts are distributed along the contours of the colon. The rectum is rarely involved, and the left colon is more frequently involved than the right. Barium enema examination reveals filling defects between the lumen, outlined by barium, and the outer margin of the bowel wall.

7674 RETRACTILE MESENTERITIS: INITIAL PRESENTATION AS COLONIC OBSTRUCTION. (Eng.) Williams, R. G.; Nelson, J. A. (Univ. Utah Medical Center, 50 N. Medical Drive, Salt Lake City, UT 84132). *Radiology* 126(1):35-37; 1978.

Two cases of apparent idiopathic mesenteric fibrosis in which the most significant problem was directly referable to the colon are presented. Both patients, a 54-yr-old woman and a 47-yr-old man, presented with signs and symptoms of bowel obstruction and a firm abdominal mass. Both had been relatively healthy prior to the onset of illness. Neither had a known family history of this or other fibrosing processes, or of exposure to allergens. There was no evidence of any coexistent neoplasm. In the first patient, a preoperative plain abdominal r[illegible] consistent with m[illegible] A barium enema examination revealed obstruction of the descending colon and apparent mucosal thumbprinting associated with a mass lesion. At operation, she was found to have multiple small and large bowel obstructions with progressive mesenteric colonic fibrosis and extensive fibrotic implants over the small bowel. A subtotal colectomy with an ileostomy and mucus fistula formation was carried out. Barium enema examination in the second patient revealed partial splenic flexure obstruction and mucosal thumbprinting. Because of near complete obstruction of the distal colon, a side-to-side transverse-to-distal sigmoid colostomy was carried out. The clinical history and findings of an obstructive lesion in the colon, where cancer is not necessarily suspected, should lead to a consideration of this entity for the radiographic diagnosis.

7675 VOLVULUS OF SIGMOID COLON IN CHILDHOOD--AN ENTITY TOO LITTLE REGARDED. (Ger.) Willmen, H. R.; Schultz-Stubner, A. (Chirurgische Klinik, Kreiskrankenanstalten Grevenbroich, 4048 Grevenbroich, W. Germany). *Aktuel. Chir.* 12(5):327-332; 1977.

The causes, symptoms, and treatment of sigmoid volvulus in children are described in connection with 12 cases observed since 1974. The patients included nine boys and three girls aged 9-15 yr. Abrupt body movement at gymnastics or play was the cause of volvulus in all cases. The volvulus manifested as sudden violent pain in the left lower abdomen, causing local tenderness and defense and hemiflexion of the left hip and knee. The transverse sigmoid coil was palpable rectally. Two-thirds of the patients developed vertigo and nausea. The patients showed a tendency to obstipation, but complete intestinal shock with hyperthermy and toxic dyspnea did not occur. The therapy was conservative in 11 cases; it consisted of bimanual detorsion (bringing immediate relief to 7 cases) and of contrast enema in 2. Bimanual detorsion can be regarded successful only if the patient has no pains after massive defecation. Operative detorsion and mesosigmoidopexy at the lateral abdominal wall was necessary in one case. Sigmoidopexy is always indicated in the case of recurrent volvulus.

7676 OBSERVATIONS OF GARDNER'S SYNDROME. (Ger.) Bosseckert, H.; Knoll, P.; Kuhne-Heid, R. (Medizinische Universitats-Klinik, Bachstr. 18, DDR-69 Jena, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(5/6):255-261; 1977.

7677 X-RAY SIGNS OF HIRSCHSPRUNG'S DISEASE INFANCY. (Hun.) Koteles, G.; Ujvary, Szirmai, Z. (Rontgenosztaly, Madarasz utcai Csec es Gyermekkorhaz, Budapest, Hungary). *Orv. Heti* 117(47):2857-2862, *passim;* 1976.

7678 CLINICAL AND THERAPEUTIC ASPECTS OF SP TANEOUS INTRAMURAL INTESTINAL HEMORRHA OCCURRING DURING ANTICOAGULANT TREATMENT. (Ger. Huber, F. B. (Krankenhaus, CH-8810 Horgen, Switz land). *Chirurg* 48(8):534-540; 1977.

7679 REDUCTION OF THE TISSUE LEVEL OF VASO-ACTIVE INTESTINAL POLYPEPTIDE (VIP) IN HIRSCHSPRUNG'S DISEASE [Letter to Editor]. (Fre Dupont, C.; Besson, J.; Laburthe, M.; Bataille, Rosselin, G.; Navarro, J. (INSERM U-55, Hopital Saint-Antoine, 184 rue du Faubourg Saint-Antoine Paris Cedex 12, France). *Nouv. Presse Med.* 6(40 3752-3753; 1977.

7680 ERRORS IN THE DIAGNOSIS AND TREATMENT HIRSCHSPRUNG'S DISEASE. (Rus.) Kusho N. L. (Dept. Pediatric Surgery, Donetsk Medical Inst., Donetsk, USSR). *Khirurgiia (Mosk.)* (1):1 104; 1978.

7681 ANORECTAL INCONTINENCE: RESULTS OF SU GICAL TREATMENT. (Ger.) Stelzner, F. (Chirurgische Universitatsklinik, D-5300 Bonn-Venusberg, W. Germany). *Chirurg* 48(7):451-456; 1977.

7682 TREATMENT OF INTESTINAL INVAGINATION CHILDREN. (Rus.) Khristich, A. D.; Portnoy, V. M. (Dept. Pediatric Surgery, Dnepropetrovsk Medical Inst. Dnepropetrovsk, USSR). *Khir.* (6):9-12; 1977.

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7684 PREVENTION AND TREATMENT OF POSTOPERAT INTESTINAL ATONIA AND OTHER FORMS OF PARALYTIC ILEUM WITH BEPANTHEN® ROCHE. (Ger.) Hanck, A. (Abteilung fur Sozial- und Praventiv-medizin, Universitat Basel, Basel, Switzerland) *Therapiewoche* 27(39):6878-6887, *passim;* 1977.

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7686 FAMILIAL DIFFUSE POLYPOSIS OF THE COL [Abstract]. (Ger.) Egger, G.; Baumg

, G. (Medizinische Klinik, Tiefenauspital, Bern,
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Pailler, J. L.; Rignault, D.; Duriez, R.;
ahaye, R. P.; Metges, P. J.; Boye, B. (Services
Chirurgie A de l'H.I.A. BEGIN, 69, avenue de
ls, 94160 Saint-Mande, France). *Rev. Fr. Gas-*
enterol. (134):15-21; 1977.

3 INFLUENCE OF THE STRUCTURE OF FOOD ON
CERTAIN DISEASES OF THE COLON AND RECTUM.
e.) Dvorak, M. (Interni Oddeleni fakultni
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tov, E. P. (Clinic General and Hosp. Surgery,
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ROLE OF ELECTROCOAGULATION IN THE MANAGE-
MENT OF SOME TYPES OF CANCER OF THE RECTUM.
.) Poirier, A.; Bou, G. (No affiliation given).
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NATURE AND SIGNIFICANCE OF COLONIC
POLYPS. (Eng.) Appel, M. F. (Baylor
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ANTIBIOTIC PROPHYLAXIS IN SURGERY OF THE
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sville Sch. Medicine, Louisville, KY 40201).
h Med. J. 70(Suppl. 1):27-31; 1977.

SPONTANEOUS CLOSURE OF URETEROCOLIC
FISTULA SECONDARY TO DIVERTICULITIS.
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andez, I. (Ellis Hosp., Schenectady, NY). *J.*
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CRITERIA FOR THE SELECTION OF RECTAL
CANCERS FOR LOCAL TREATMENT: A CLINICO-
OLOGIC STUDY OF LOW RECTAL TUMORS. (Eng.)
ney, M. G.; Irvin, T. T. (Royal Infirmary,
field S6 3DA, England). *Dis. Colon Rectum*
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RECTAL BLEEDING OF UNKNOWN ETIOLOGY IN
INFANTS AND CHILDREN. (Eng.) Livaditis,
Toumazani, M. (Karolinska Sjukhuset, S-10401
kholm, Sweden). *Z. Kinderchir.* 21(4):331-336;
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SPONTANEOUS RUPTURE OF THE COLON. (Eng.)
Gupta, R. K.; Agrawal, A. K. (V. S. Mehta Hosp., Ramghat, Varanasi, India). *Int. Surg.* 62(8):429-430; 1977.

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7700 COLONOFIBEROSCOPY IN RECURRENT ANORECTAL DISEASE. (Eng.) O'Connor, J. J. (Dept. Surgery, Georgetown Univ., Washington, DC). *Abdom. Surg.* 19(9):198-199; 1977.

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7702 POLYPS AND CARCINOMA OF THE LARGE INTESTINE. (Eng.) Nakagawara, G.; Miyazaki, I. (Sch. Medicine, Kanazawa Univ., Kanazawa, Japan). *Chir. Gastroenterol.* 11(2):217-223; 1977.

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7711 ANAL MALIGNANT MELANOMA: REPORT OF A CASE. (Eng.) Chulani, H. L. (G. T. Hosp., Bombay, India). *Dis. Colon Rectum* 20(6):517-520; 1977.

7712 A SUGGESTED METHOD OF PREPARATION OF THE LARGE BOWEL FOR INVESTIGATION AND SURGERY. (Eng.) Miles, A. E.; Stevens, P. J. d'E. (Dept. Surgery, Univ. Cape Town, Cape Town, South Africa). *S. Afr. Med. J.* 52(16):639-641; 1977.

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McKittrick, J. E.; Latimer, R. G.; Doane, W. A. (Santa Barbara Medical Foundation Clinic, Santa Barbara, CA). *Chir. Gastroenterol.* 11(2):239-242; 1977.

7718 FLEXIBLE SIGMOIDOSCOPY: AN EFFECTIVE SCREENING TEST FOR COLONIC POLYPS [Abstract]. (Eng.) Lipshutz, G. L.; Katon, R. M.; McCool, M. F.; Mayer, B.; Smith, F. W.; Melnyk, C. S. (Univ. Oregon Health Sciences Center, Portland, OR). *Clin. Res.* 26(2):11A; 1978.

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IN COLON CARCINOMA PATIENTS ALREADY RECEIVING 5-FU [Abstract]. (Eng.) Werk, W.; Wischerath, H. (Dept. Serology, Univ. Munich, Munich, W. Germany). *Cancer Immunol. Immunother.* 3(Suppl.):S31; 1977.

7720 MANOMETRIC AND ELECTROMYOGRAPHIC INVESTIGATIONS AFTER TREATMENT OF FECAL INC
TINENCE BY AN INTRA-ANAL PLUG ELECTRODE [Abstract
(Eng./Ger.) Fiedel, U.; Larkamp, H.; Stock, W.; Muller, I. N. (Chirurgische Universitatsklinik Koln, Josef Stelzmann-Str. 9, D-5000 Koln 41, W. Germany). *Langenbecks Arch. Chir.* 345:614; 1977.

7721 ALTERED INTESTINAL SENSITIVITY TO BILE
ACIDS AND SMALL INTESTINAL SECRETION I
IRRITABLE BOWEL SYNDROME ASSOCIATED WITH DIARRHE
[Abstract]. (Eng.) Rask-Madsen, J.; Oddsson, E
Krag, E. (Herlev Hosp., Copenhagen, Denmark). *Gut* 18(11):A963-A964; 1977.

See also, 7275, 7459, 7478, 7479, 7487, 7495, 74
7625, 7630, 7639, 7643, 7653, 7723, 77
7726, 7865, 7889, 7915, 7918, 7919, 79
7933, 7934, 7936, 7939, 7947, 7948, 79
7954, 7957, 7958, 7959, 7964, 7971.

Ulcerative Colitis

SKIN TEST REACTIVITY IN INFLAMMATORY
BOWEL DISEASE IN THE UNITED STATES AND
IOSLOVAKIA. (Eng.) Thayer, W. R., Jr.; Fixa,
Komarkova, O.; Charland, C.; Field, C. E. (Rhode
id Hosp., 593 Eddy St., Providence, RI 02902).
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nts with inflammatory bowel diseases and
ols in the United States and in Czecho-
kia were tested with five skin test anti-
at two different dilutions to elicit some
nce of anergy. *Candida* was first injected as
,000 dilution; if this initial skin test was
ive, a second strength dilution (1:100) was
administered. Mumps was injected intradermally
complement-fixing units, and no second strength
en was used. Purified protein derivative (PPD)
njected intradermally at 1 US unit, and if
was negative, 5 US units were injected. Strep-
ase-streptodornase (SK-SD) was first used as
bination of 100 U streptokinase and 25 U of
todornase. If the response to the first
gth was negative, a second injection of 400
SK and 100 U of SD was injected. Trichophytin
njected first as a 1:100 dilution, and the
d strength was 1:30. No skin test anergy was
to exist when patients were compared to
ols. The incidence of PPD responsiveness
e Czechoslovakian subjects was greater than
e United States subjects ($p<0.01$ for patients
<0.001 for controls). When reactivity to
-strength injections only was assessed, no
ficantly diminished responsiveness was ap-
t between the two populations or between any
nt group and its controls. Comparisons based
e number of individuals responding positively
1, 2, 3, 4, or 5 out of 5 skin test antigens
strated that no significant differences were
ntered between the two populations or between
atient group and its controls. There is no
nce of anergy as assessed by diminished skin
reactivity in patients with inflammatory bowel
ses.

UROLITHIASIS IN CHRONIC INFLAMMATORY
BOWEL DISEASE. (Eng.) Knudsen, L.;
ssen, H.; Fleckenstein, P.; Pedersen, E. B.;
n, S. (Rigshospitalet, DK-2100, Copenhagen,
rk). *Scand. J. Gastroenterol.* 13(4):433-436;

rospective clinical study of the occurrence
inary calculi was analyzed in 494 consecutive
artially selected patients with chronic
mmatory bowel disease (CIBD) to elucidate
echanism of stone formation. By restrict-
he analysis only to patients studied by
pyelography (IP), the material was cur-
l to 140 patients with Crohn's disease (CD)
3 with ulcerative colitis (UC). Urolithiasis
roved by IP in 18/140 patients with CD and
with UC, with no significant difference be-
the two groups or by sex in either group.
There were no significant correlations of urolithiasis to duration of disease, history of ileostomy, site of lesion, or extent of disease. Urolithiasis was significantly correlated to a history of small bowel resection ($p<0.01$), most strongly so in those with resections ≥ 50 cm in length. Only among patients with UC was urolithiasis more common among the steroid-treated than among the nonsteroid-treated ($p<0.01$). Urolithiasis was also significantly increased in patients with urinary tract obstruction ($p<0.05$ for CD, $p<0.01$ for UC). The results are consistent with the hypothesis that the hyperabsorption of oxalate following ileal resection plays an important role in stone formation. The essential role of local factors in stone formation is apparent from the increased incidence of calculi in patients with urinary tract obstruction. The few and negligible symptoms of and sequelae to urolithiasis in CIBD encourage a conservative attitude.

7724 THE DILEMMA OF PRESERVATION OF THE RECTUM: RETENTION OF THE RECTUM IN COLECTOMY FOR INFLAMMATORY DISEASE OF THE BOWEL. (Eng.) Mavroudis, C.; Schrock, T. R. (Dept. Surgery, Univ. California, San Francisco, CA). *Dis. Colon Rectum* 20(8):644-648; 1977.

The records of 100 consecutive patients who underwent total abdominal colectomy, proctectomy, or both for inflammatory bowel diseases at one hospital between 1966 and 1976 are reviewed to determine the validity of the current policy in which the rectum is retained and anastomosed to the ileum only when the rectum is not involved by inflammatory disease. The rectum was preserved at the time of colectomy in 58 patients, but only 18 had normal rectums at the initial operation. Only nine patients underwent ileoproctostomy, six primarily and three secondarily. Only three patients are living with ileoproctostomy; among the remaining patients, one died of colonic cancer, three subsequently underwent proctectomy, and two have a defunctionalized rectum with ileostomy. These results indicate that when the rectum is involved by inflammatory disease, it is advisable to do a proctectomy to eliminate the risk of cancer and to restore patients to productive lives.

7725 TOTAL COLECTOMY AND MUCOSAL PROCTECTOMY WITH PRESERVATION OF CONTINENCE IN ULCERATIVE COLITIS. (Eng.) Martin, L. W.; LeCoultre, C.; Schubert, W. K. (Coll. Medicine, Univ. Cincinnati, Cincinnati, OH). *Ann. Surg.* 186(4):477-480; 1977.

A technique for preserving rectal continence in patients undergoing total colectomy for chronic ulcerative colitis is described, and its results in 17 patients are presented. Intensive medical management, total parenteral alimentation, steroid therapy, establishment of a preliminary diverting ileostomy with subtotal colectomy, or a combination of these measures are required to insure that the rectal mucosa is free of gross disease at the time of operation. At surgery, the rectal mucosa is removed, but all the anorectal musculature is preserved. Total colectomy is performed, and the terminal ileum is then placed inside the retained muscular wall of the rectum and anastomosed to the anus. Satisfactory results were obtained in 15 patients, and no patient died. Thirteen patients are completely continent, and the other two have proximal ileostomies that have not yet been closed. The two failures were both due to pelvic sepsis, emphasizing the need for thorough rectal irrigation at the time of operation. All patients had frequent, watery stools for several weeks following surgery, and as long as 6 or 12 months were required for adaptation. Only four patients still have diarrhea, but this is satisfactory for the stage after operation. Ten patients, including the two failures, developed postoperative complications. These included wound infections (5 patients) due to operative rectal perforation, bleeding from the superior hemorrhoidal artery (1 patient), small bowel obstruction due to adhesions (3 patients), and "cuff abscess" (3 patients). The latter was an abscess forming inside the rectal cuff between it and the wall of the ileum and in the absence of anastomotic leak. All three patients developed stricture requiring release or dilatation. The results in these patients suggest that it is possible to perform a total colectomy with mucosal proctectomy and preserve anorectal continence.

7726 THE PROGNOSIS OF CARCINOMA OF THE COLON AND RECTUM COMPLICATING ULCERATIVE COLITIS. (Eng.) Hughes, R. G.; Hall, T. J.; Block, G. E.; Levin, B.; Moossa, A. R. (Pritzker Sch. Medicine, Chicago, IL). *Surg. Gynecol. Obstet.* 146(1): 46-48; 1978.

To test the hypothesis that the prognosis of colonic carcinoma in association with ulcerative colitis is poor, the survival rates and the tumor spread in 29 patients with ulcerative colitis and colonic carcinoma were compared with those in matched controls with carcinoma but without colitis. There were a total of 33 tumors in the 29 patients with colitis. The 5-yr survival rate in the group with colitis was 55.1%, and that in the patients without colitis was 46.9%, which was not a statistically significant difference. The spread of tumor as measured by penetration of the intestinal wall and by adjacent nodal invasion for the two patient groups showed that 30.5% of the carcinomas in patients without colitis had the same degree of spread as did those in patients with colitis; 44% of the carcinomas in patients without colitis had a more extensive spread and 25.5% of the carcinomas in patients without colitis exhibited less invasion than did carcinomas in patients with colitis. Patients with colitis and colonic carcinoma did not have more extensive penetration of the intestinal wall or more frequent nodal invasion than did those with carcinoma without colitis. In fact, the tumors arising in previously normal intestine appeared to exhibit a tendency for a greater degree of spread than did those tumors arising from an inflamed intestine ($p<0.001$). Tumors in patients with ulcerative colitis exhibit no greater invasiv ness and are associated with the same overall survival rate as those occurring in a population without colitis.

7727 SALT-LOSING DIARRHOEA IN IDIOPATHIC PROCTOCOLITIS. (Eng.) Caprilli, R.; Sopran N.; Colaneri, O.; Levi Della Vida, M.; de Magistri L. (Second Medical Clinic, Univ. Rome, Policlinico Umberto I, 00100 Rome, Italy). *Scand. J. Gastroenterol.* 13(3):331-335; 1978.

The fecal chloride, sodium, and potassium outputs were studied in 14 patients with active idiopathic proctocolitis to establish a relationship between fecal electrolyte output and acid-base balance data. Seven ileostomized patien and eight healthy subjects served as controls. Mean sodium output was significantly higher in bot ileostomy patients ($p<0.05$) and in the patients wi proctocolitis ($p<0.05$) than in the normal subjects The mean chloride excretion was also significantly higher in both patient groups ($p<0.01$), and high chloride excretion was seen in all but two patient with proctocolitis. Potassium excretion was not significantly different in the controls and proctocolitis patients, but it was significantly lower than controls in the ileostomized patients ($p<0.0$ It appears that the colons of patients with proctocolitis have an impaired capacity to absorb chl ide and sodium but retain the ability to secrete potassium. Intestinal sodium, chloride, and wate loss may be regarded as a salt-losing diarrhea an may account for the metabolic alkalosis commonly found in proctocolitis.

7728 NONSPECIFIC CHRONIC INFLAMMATORY INTESTINAL DISEASES. (Ger.) Hubner, K. (Kl ikum der Johann Wolfgang Goethe-Universitat, Theo Stern-Kai 7, 6000 Frankfurt am Main 70, W. German *Therapiewoche* 27(38):6641-6650, *passim;* 1977.

7729 ULCERATIVE COLITIS. (Fre.) Beaudry, R (Centre Hospitalier Universitaire, Sherbrooke, Quebec, Canada). *Rev. Fr. Gastroenterol.* (123):35-40; 1976.

7730 CLINICAL VARIANTS OF NONSPECIFIC ULCERA TIVE COLITIS IN CHILDREN. (Rus.) Makh mudov, O. S. (2nd Dept. Childhood Infections, Cen tral Asiatic Medical Inst. Pediatrics, USSR). *Pe atriia* (4):36-39; 1977.

7731 ULCERATIVE COLITIS: ITS INCIDENCE AND TREATMENT AT A CENTRAL HOSPITAL. (Nor. Lorentsen, E. (Sentralsykehuset i Akershus, Medisinsk og Kirurgisk avdeling, Akershus, Norway). *Tidsskr. Nor. Laegeforen.* 93(22):1075-1078; 1977.

7732 CLINICAL PICTURE OF ULCERATIVE COLITIS. (Ger.) Rettberg, H. (Zentrum der Inneren Medizin der Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt a. M., W. Germany). *Therapiewoche* 27 (38):6653-6660, *passim;* 1977.

7733 PSYCHOSOMATIC ASPECTS OF ULCERATIVE COLITIS AND CROHN'S DISEASE. (Ger.) Freyberger, H. (Medizinische Hochschule Hannover, Hannover, W. Germany). *Therapiewoche* 27(38):6675-6682, *passim;* 1977.

7734 PSYCHOPATHOLOGIC PROFILE OF A PATIENT WITH HEMORRHAGIC RECTOCOLITIS. (Fre.) Salas, H.; Maffioli, C.; Louvet, H. (C.H.U., Hopital Robert Debre, Rue Alexis Carrel, 51100 Reims, France). *Rev. Fr. Gastroenterol.* (131):37-45; 1977.

7735 CURRENT STATUS OF SURGICAL TREATMENT FOR ULCERATIVE COLITIS AND CROHN'S DISEASE OF THE LARGE BOWEL. (Eng.) Goligher, J. C. (General Infirmary, Leeds LS1 3EX, England). *Can. J. Surg.* 21(1):28-38; 1978.

7736 PICTURE OF NONSPECIFIC ULCERATIVE COLITIS IN HELMINTHIASIS. (Rus.) Karnaukhov, V. K. (E. I. Martsinovskii Inst. Medical Parasitology and Tropical Medicine, USSR Ministry Public Health, Moscow, USSR). *Klin. Med. (Mosk.)* 55(2): 58-61; 1977.

See also, 7469, 7495, 7673, 7965.

PANCREAS

737 PERCUTANEOUS FINE NEEDLE ASPIRATION BIOPSY OF THE PANCREAS FOLLOWING ENDOSCOPIC ETROGRADE CHOLANGIOPANCREATOGRAPHY. (Eng.) o, C. S.; McLoughlin, M. J.; McHattie, J. D.; ao, L. C. (Toronto General Hosp., Toronto, Onario, Canada). *Radiology* 125(2):351-353; 1977.

arly experience in combining percutaneous fine eedle aspiration biopsy with endoscopic retrograde holangiopancreatography (ERCP) in the diagnosis f pancreatic cancer is reported. The combined rocedures were performed in nine patients with uspected pancreatic malignancies. The ERCP dignosis was carcinoma in eight of the nine paients and localized stenosis of the body of the ancreas in the ninth patient. Biopsy confirmed he diagnosis in seven of the eight patients with arcinoma and provided a diagnosis of pancreatitis n the ninth patient. ERCP is an accurate method or diagnosing pancreatic cancer, and fine needle spiration biopsy can confirm this diagnosis afely and easily.

738 ANNULAR PANCREAS: A NEW CLASSIFICATION AND CLINICAL OBSERVATIONS. (Eng.) Johnton, D. W. B. (Westminster Hosp., London, Ontario 5A 4S2, Canada). *Can. J. Surg.* 21(3):241-244; 978.

even cases of annular pancreas are described in hich the diagnosis was confirmed at autopsy or peration. Annular pancreas appears to comprise wo distinct subtypes not previously recognized. In type 1 (extramural), the ring of pancreatic tissue lies on the muscular wall of the duodenum and is covered by a thin layer of peritoneum. A definite plane of cleavage may be established between the annulus and the duodenum. There is always a main duct that sweeps dorsally and to the right around the duodenum to empty into the common bile duct or into the main pancreatic duct. Type 1 is usually associated with a dilated duodenum or megalobulbus and produces symptoms of high intestinal obstruction. In type 2 (intramural), the pancreatic tissue lies buried in the wall of the duodenum; any attempt to dissect out the annulus results in opening the lumen of the duodenum. There is no main ductal system, but rather a network of small canaliculi. Type 2 is usually associated with duodenal ulceration, and the clinical symptoms are due to the ulcer rather than to the annulus. Surgical treatment of type 1 is most successful if a simple bypass procedure is carried out. Surgical treatment of type 2 is subtotal gastrectomy with or without vagotomy.

7739 PANCREATIC ASCITES: REPORT OF TWO CASES. (Eng.) Aitchison, J. M.; White, J. A. M. (Addington Hosp., Durban, South Africa). *S. Afr. Med. J.* 52(24):982-984; 1977.

Two cases of pancreatic ascites are reported in which endoscopic retrograde and operative pancreatography were used to demonstrate the source of leakage from the duct system. The first patient was an alcoholic 34-yr-old man with a pancreatic pseudocyst. At laparotomy, contrast material was injected into the pseudocyst and appeared to leak into the general peritoneal cavity through the gastroepiploic foramen. A large retention cyst was demonstrated in the head of the pancreas, but no communication with the pancreatic duct system was found. A Roux-en-Y pancreaticojejunostomy was employed to drain both the retention cyst and the pseudocyst. The second patient was a 37-yr-old woman with recurrent severe abdominal pain, vomiting, diarrhea, weight loss, and ascites. Endoscopic retrograde pancreatography showed gross distortion of the gastric antrum and pylorus but no intrinsic lesion of the stomach or duodenum. Cannulation of the pancreatic duct and injection of contrast material demonstrated a stricture of the distal main pancreatic duct and leakage of contrast material through a fistula at the stricture into the lesser sac. The distal pancreatic duct system appeared to be grossly distorted with an intrapancreatic abscess cavity. A preoperative diagnosis of pancreatitis of unknown etiology with ascites secondary to leakage from an obstructed duct system was made. At laparotomy, dense adhesions were found around the distal pancreas, which was distorted and fibrosed. An abscess cavity was found in relation to the tail of the pancreas. The exact site of leakage from the duct system could not be identified, but the transitional zone from normal to abnormal pancreatic tissue was immediately to the left of the portal vein. The patient is asymptomatic 1 yr following distal pancreatectomy and splenectomy.

7740 INDOMETHACIN-RESPONSIVE PANCREATIC CHOLERA.

(Eng.) Jaffe, B. M.; Kopen, D. F.; DeSchryver-Kecskemeti, K.; Gingerich, R. L.; Greider, M. (Washington Univ. Sch. Medicine, 4960 Audubon Ave., St. Louis, MO 63110). *N. Engl. J. Med.* 297 (15):817-821; 1977.

The case of a patient with the Verner-Morrison syndrome whose symptoms rapidly abated after the institution of indomethacin therapy is presented. The patient, a 67-yr-old woman, had a 9-yr history of diarrhea. She noted a 7-kg weight loss and weakness during the 3 months before she was hospitalized. A 1-week trial of p.o. indomethacin (25 mg/8 hr) resulted in marked diminution of stool volume and frequency, with attainment of essentially normal bowel habits. At laparotomy, a well-circumscribed tumor of the tail of the pancreas was resected. The patient is asymptomatic 3 months after surgery and has not required indomethacin. The plasma prostaglandin E, prostaglandin F, vasoactive intestinal peptide (VIP), gastrin, and human pancreatic polypeptide (HPP) levels were 977, 39, 82, 44, and 631 pg/ml on admission; with indomethacin treatment, these levels were 311, 45, 48, 41, and 621 pg/ml, and the postoperative levels were 310, 76, 129, 41, and 377 pg/ml, resp. The levels in the tumor were 52.5, 2.3, 7.7, 0.3, and 830 ng/g, and the levels in the pancreas were 3.5, 7.6, 1.5, 0.5, and 11,370 ng/g, resp. These results show that VIP or HPP was not involved in the pathogenesis of this patient's symptoms; prostaglandin E was clearly implicated in this patient.

7741 RAPID DEVELOPMENT AND SPONTANEOUS REGRESSION OF PANCREATIC PSEUDOCYSTS DOCUMENTED BY ULTRASOUND.

(Eng.) Sarti, D. A. (Univ. California at Los Angeles Center for the Health Sciences, Los Angeles, CA 90024). *Radiology* 125(3): 789-793; 1977.

Three cases of pancreatic pseudocyst were followed serially by ultrasound examination. In the first case, the development of a pancreatic pseudocyst was well-documented by serial ultrasound examinati No pseudocyst was present 6 days prior to the documentation of a large cyst found following an acute episode of abdominal pain markedly different from any pain noted previously during the hospital admission. The episode was initially felt to be due to acute exacerbation of the patient's pancreatitis, but in retrospect it coincided with the development of the pseudocyst. The patient underwent surgery 24 days after the last normal ultrasound study was done and 18 days after the pseudocyst was first documented. The pseudocyst probably developed at the time of the acute episode. This case indicates that pseudocysts of a relatively large size can arise quite rapidly and that acute abdominal pain suspected of being an exacerbation of underlying pancreatitis may indicate impending pseudocyst development. The wall of this pseudocyst was found to be mature enough to anastomose to the jejunum at the time of surgery. The maximum length of time for this maturation to have occurred was 3.5 weeks, with a minimal possible time of less than 3 weeks. In the other two patients, the pseudocysts regressed spontaneously. Pancreatic abscess could not be ruled out in these cases, but the patients did not manifest severe leukocytosis or fever and received no antibiotic therapy. The ultrasound findings of pancreatic abscess usually show thick more irregular walls than those demonstrated in these patients. One patient had been scheduled for surgery until the ultrasound examination revealed a decrease in the size of the cyst. She was followed by ultrasound and treated medically with successful results. The other patient's pseudocyst gradually increased in size until it reached 4 cm. She subsequently develope an acute episode of abdominal pain and, after thi ultrasound no longer showed the pseudocyst. Thes cases illustrate that presently held convictions concerning the evolution and treatment of pancreatic pseudocysts must be reevaluated.

7742 NESIDIOBLASTOMA OF THE HEAD AND UNCINAT PROCESS OF THE PANCREAS.

(Fre.) Pouye M.; Treboux, M.; Daubricourt, M.; Chollat, L. (Cl ique Claude Bernard, 69600 Oullins, France). *Lyo Chir.* 73(2):148-150; 1977.

7743 NEONATAL SCREENING FOR CYSTIC FIBROSIS.

(Ita.) Giunta, A.; Giovannini, M. (Cli

Pediatrica I dell'Universita, Via Commenda 9,
n, Italy). *Minerva Med.* 68(30):2123-2128; 1977.

4 HYPERAMYLASEMIA WITH MACROAMYLASEMIA.
(Hun.) Pataki, I. (Varosi Tanacs Korhaza,
onti Laboratorium, Szentes, Hungary). *Orv.*
l. 118(4):203-205; 1977.

5 GASTROENTEROLOGIC ASPECTS OF MUCOVISCIDOSIS. (Fre.) Bury, F.; Eggermont, E.
derziekenhuis Gasthuisberg, Katholieke Uni-
iteit te Leuven, B-3000 Leuven, Belgium). *Pe-*
rie 31(6):551-562; 1976.

5 HEMORRHAGIC PANCREATIC NECROSIS IN EARLY CHILDHOOD. (Rus.) Bergina, I. A.; Sol-
v, Iu. N. (Central Municipal Hosp., Roven'ka,
shilovgrad Oblast, USSR). *Khirurgiia (Mosk.)*
114-115; 1978.

ANGIOGRAPHIC DIAGNOSIS OF HEMORRHAGE FROM A PANCREATIC PSEUDOCYST WITH VENOUS DRAIN-
(Ger.) Trapp, P.; Bode, A. (Rontgenabtei-
, AK. Wandsbeck, 2000 Hamburg 70, W. Germany).
schr. Geb. Roentgenstr. Nuklearmed. 127(2):188-
1977.

7748 PANCREATIC PSEUDOCYST OF UNUSUAL LOCALIZATION. (Ger.) Otto, R.; Linder, E. (Rontgendiagnostisches Zentralinstitut, Universitat Zurich, Ramistrasse 100, CH-8091 Zurich, Switzerland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 126(3):270-271; 1977.

7749 PERIPANCREATIC TUBERCULOSIS. (Fre.) Danne, O.; Mehaut, M.; Gouerou, H.; Cerf, M.; Gosset, F.; Debray, C. (Hopital Corvisart, 22, rue d'Aubilly, 08107 Charleville-Mezieres, France). *Sem. Hop. Paris* 53(11/12):703-706; 1977.

7750 VERNER-MORRISON'S SYNDROME. (Fre.) L'Esperance, G.; Lamoureux, C.; Giroux, Y. (Hopital Maisonneuve-Rosemont, 5415, boul. de l'Assomption, Montreal H1T 2M4, Quebec, Canada). *Union Med. Can.* 106(6):847-852; 1977.

See also, 7480, 7481, 7482, 7483, 7485, 7487, 7490, 7495, 7599, 7655, 7751, 7756, 7758, 7761, 7765, 7766, 7767, 7769, 7774, 7775, 7779, 7804, 7810, 7869, 7892, 7912, 7936.

PANCREAS

Pancreatitis

AMYLASE THERMOLABILITY: ITS APPLICATION IN THE DIAGNOSIS OF ACUTE PANCREATITIS AND
REATIC PSEUDOCYSTS. (Eng.) Donaldson, L.
Brodie, M. J.; Joffe, S. N.; McIntosh, W.
J. Meyer Memorial Hosp., Buffalo, NY). *Surg.*
m 28:444-445; 1977.

usefulness of a thermolability technique for
accurate identification of serum amylase iso-
mes was investigated using sera from 22 pa-
ts with acute pancreatitis, 12 with acute par-
is, 14 with resolved pancreatitis, 9 with
reatic pseudocyst, and 23 healthy controls.
percentage thermolabile amylase in each of
e groups was 84 ± 13, 83 ± 12, 55 ± 10, 79 ±
and 44 ± 10, resp. These findings are con-
ent with an outpouring of salivary or pan-
tic (i.e., heat-labile) amylase during in-
matory processes of the parotid glands or
reas. As pancreatitis resolves, the normal
l of thermolability (44 ± 10%) is again ap-
ched (55 ± 10%). Amylase thermolability is
ick and simple test that appears to increase
clinical application of the serum amylase
l as a diagnostic tool in acute pancreatitis
pancreatic pseudocyst.

7752 DEATH FROM ACUTE PANCREATITIS: M.R.C. MULTICENTRE TRIAL OF GLUCAGON AND APROTININ. (Eng.) Welbourn, R. B.; Armitage, P.; Gilmore, O. J. A.; MacKay, C.; Trapnell, J. E.; Williamson, R. C. N.; *et al.* (Northwick Park Hosp., Watford Rd., Harrow, Middlesex, HA1 3UJ, England). *Lancet* 2(8039):632-635; 1977.

The influence of glucagon and aprotinin on the death rate from acute pancreatitis was studied in a randomized double-blind multicenter trial, which included 257 patients with a serum amylase level of at least 2,000 IU/l. The drug doses were: aprotinin, 500,000 U i.v. immediately followed by 300,000 U by i.v. infusion 6-hourly for 5 days and glucagon, 2 mg, i.v., immediately followed by 2 mg by i.v. infusion 6-hourly for 5 days. The death rate in the whole group was 11%. The differences between treatment groups were not statistically significant (χ^2=0.26, 0.8<p<0.9). Neither the etiological factors in the development of pancreatitis, nor the age or sex of the patient influenced the death rate significantly. Active treatment did not improve the chances of survival in patients in whom there was no history of a previous attack, and active treatment failed to influence the death rate in those patients who did not have surgical treatment. The results indicate that, in the doses used, neither drug diminishes the risk of death in acute pancreatitis.

7753 LIPID ALTERATIONS IN ACUTE PANCREATITIS. (Eng.) Lazaro, E. J.; Bose, A. K.; Spraggins, R.; Dispenziere, B. R. (Martland Hosp., 65 Bergen St., Newark, NJ 97107). *Can. J. Surg.* 21(3): 270-271; 1978.

Important and previously unreported changes in carbon-16 and carbon-18 fatty acids of the blood in acute experimental pancreatitis in dogs and acute pancreatitis in humans are described. Acute pancreatitis was induced by the Pfeffer closed duodenal loop in 7 dogs; in the control animals, conditions that clinically resemble acute pancreatitis were induced: celiotomy (3 dogs), bilateral ureteral ligation (3), duodenal perforation (3), strangulation obstruction (4), strangulation obstruction with manipulation of the common bile duct (3), and hemipancreatectomy (2). Venous blood samples were obtained at 0, 3, 6, and 9 hr after each operation, and the animals were sacrificed for autopsy. Mass spectroscopy and gas chromatography were used to study the blood fatty acid profile in these animals and in three patients with acute pancreatitis and five with nonpancreatic acute abdominal disease (controls). A marked increase in the concentration of fatty acids with mono-unsaturation in both carbon-16 and carbon-18 chains and with di-unsaturation in the carbon-18 chains was observed. The amount of carbon-16 unsaturated acids increased from about 15% of the saturated carbon-16 acids in controls to up to 20 times that amount in acute pancreatitis.

7754 ACUTE PANCREATITIS AND SEROLOGICAL EVIDENCE OF INFECTION WITH Mycoplasma pneumoniae. (Eng.) Freeman, R.; McMahon, M. J. (General Infirmary, Leeds, England). *Gut* 19(5):367-370; 1978.

Paired serum samples from 27 patients with acute pancreatitis were examined for evidence of infection with *Mycoplasma pneumoniae, Coxiella burneti,* influenza viruses types A and B, adenovirus, chlamydia subgroup B, mumps virus, and Coxsackie viruses group B, types 1-6 because previous studies have suggested that some cases of pancreatitis are associated with viral agents or with *M. pneumoniae.* Evidence of infection with Coxsackie viruses group B was found in three patients and of infection with *M. pneumoniae* in nine patients. No evidence of *M. pneumoniae* was found in any of the three patients with evidence of Coxsackie virus infection. The results support those previously reported in which a substantial proportion of patients with acute pancreatitis have serological evidence of *Mycoplasma* infection, but this link must be further investigated.

7755 RESPIRATORY COMPLICATIONS OF ACUTE PANCREATITIS. (Ger.) Baumann, C.; Akovbiantz, A.; Danczkay, Z.; Heinzelmann, F. (Kantonsspital, Ramistrasse 100, CH-8091 Zurich, Switzerland). *Helv. Chir. Acta* 44(4):509-513; 1977.

Severe respiratory complications were seen in 12 patients with acute hemorrhagic pancreatitis. Pancreatitis was due to lithiasis in four patients, to alcoholism in three, and the etiology was not ascertained in one. Four patients had postoperative pancreatitis: one after cholecystectomy, two after surgery on the common bile duct, and another after total gastrectomy. Most blood gas parameters and radiological changes of the thorax became pathological within the first 3 days of pancreatitis. Despite intensive care, 11 patients died, including those with postoperative pancreatitis. The findings indicate the importance of the detection of early hypoxia, which should be treated as soon as possible by sufficient oxygenation. If the arterial pO_2 does not improve, endotracheal intubation should be performed without undue delay.

7756 ATYPICAL PANCREATIC PSEUDOCYSTS. (Eng.) Oleszchuk-Raszke, K.; Domanski, Z.; Niezabitowski, K. (Pomeranian Medical Acad. in Szczecin, Szczecin, Poland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(4):464-468; 1978.

Three cases of atypical pancreatic pseudocyst, occurring in the course of chronic pancreatitis are presented. The cysts, formed by means of fistulization along the lienorenal ligament, were diagnosed on the basis of arteriography and confirmed surgically. In case I, splenomegaly was present, and selective celiac and superior mesenteric arteriography showed an avascular mass (15 x 8 cm) in the external part of the spleen. The removed intrasplenic pseudocyst was filled with yielded fluid (diastase determination, 8,888 Wohlgemuth's U; lipase determination, 0.6 U/ml). In case II, a palpable mass in the left upper quadrant with posterior displacement of the stomach was shown by selective splenic arteriography to be an avascular mass 8 cm in diameter. Indirect splenoportography showed splenic vein obstruction, one of the first symptoms of pancreatic pseudocyst in the hilus of the spleen. The cyst with the distal part of the pancreas and the spleen were resected. In case III, a palpable mass developed in the left upper quadrant 4 months after chronic pancreatitis and obstruction of the splenic vein had been diagnosed. During arteriography, there appeared a regular, oval blush (7 x 9 cm), characteristic of bleeding into the cyst, in the region of the tail of the pancreas. The vascular blush increased in intensity and persisted 20 min. The authors conclude that the possibility of an atypical pancreatic pseudocyst should be considered in all cases of chronic pancreatitis. Radiological diagnosis of such a cyst is possible by means of selective celiac, splenic, and superior mesenteric arteriography, and early diagnosis is vital to a successful outcome.

7757 THE PANCREAS AND IMMUNOGLOBULINS. II. IMMUNOGLOBULIN LEVELS IN THE PANCREATIC

RETIONS OF PATIENTS WITH CHRONIC PANCREATITIS.
;.) Soto, J.; Aufses, A. H., Jr.; Dreiling,
. (Mount Sinai Sch. Medicine, City Univ. New
, 100th St. and Fifth Ave., New York, NY 1002
J. *Gastroenterol.* 67(6):561-564; 1977.

etermine whether immunologic participation
hronic pancreatitis might explain the per-
ence and progressive nature of the disease,
secretory patterns of immunoglobulins in 15
ents with chronic pancreatitis were compared
those of patients without pancreatic disease.
mean IgG, IgA, and IgM levels in the patients
28.5 ± 24.8 mg/dl, 17.5 ± 11.4 mg/dl, and
± 1.1 mg/dl, resp. These levels were not
ificantly different from those in the patients
out pancreatic disease (21.44 ± 16, 7.20 ±
and 1.5 ± 0.97 mg/dl, resp.). However, in
ents who stopped drinking but nevertheless
on to develop chronic pancreatitis, higher
normal pancreatic IgG and IgA levels were
d, thereby implying an immunologic mechanism
he cause of progressive pancreatic abnormality.

PANCREATITIS AND PANCREATIC CARCINOMA,
DIAGNOSED BY PEROPERATIVE FINE NEEDLE
RATION BIOPSY. (Eng.) Hastrup, J.; Thommesen,
Frederiksen, P. (Municipal Hosp., Aarhus, Den-
). *Acta Cytol.* 21(6):731-734; 1978.

cytologic pattern was evaluated in 37 benign
malignant pancreatic lesions in a series of
needle aspiration biopsies. Malignant cells
correctly identified in all 19 cases of cancer
pt 2 highly differentiated adenocarcinomas; the
gnant cells identified came from 17 adenocar-
mas, 1 fibrosarcoma, and 1 lymphoma. Since
ammatory cells, debris, and atypical cells were
d in both the benign (i.e., pancreatitis) and
malignant tissue, the cytodiagnosis of pancrea-
s was not reliable.

EVALUATION OF GLUCAGON AS TREATMENT FOR
ALCOHOL-RELATED PANCREATITIS [Abstract].
.) Olazabal, A.; Fuller, R. K. (Cleveland
rans Admin. Hosp., Cleveland, OH). *Gastro-*
rology 72(5, Part 2):1109; 1977.

CONSIDERATIONS ON A STATISTICAL SURVEY OF
104 SURGICAL PROCEDURES PERFORMED OVER A
EAR PERIOD TO MANAGE CHRONIC PANCREATITIS.
.) Doutre, L. P.; Perissat, J. (Clinique Chir-
cale Hospitalo-Universitaire, Bordeaux, France).
. *Gastroenterol.* 11(1):141-145; 1977.

ACUTE PANCREATITIS OCCURRING IN GASTRIC
ABERRANT PANCREATIC TISSUE. (Eng.) Green,
. R.; Barratt, P. J.; Percy, J. P.; Cumberland,
.; Middleton, W. R. J. (Royal North Shore Hosp.
ydney, St. Leonards, New South Wales 2065, Aus-
ia). *Am. J. Dig. Dis.* 22(8):734-740; 1977.

7762 DRUG-INDUCED ACUTE PANCREATITIS. (Eng.) Nakashima, Y.; Howard, J. M. (Medical Coll. of Ohio, Toledo, OH). *Surg. Gynecol. Obstet.* 145(1):105-109; 1977.

7763 PANCREATITIS IN PREGNANCY. (Eng.) Bolen, J. W.; LeGrand, L. R. (199 Hospital Drive, Galax, VA 24333). *Va. Med. Mon.* 104(4):237, 239; 1977.

7764 PURE PANCREATIC JUICE RESPONSE TO SECRETIN IN NORMAL SUBJECTS AND CHRONIC PANCREATITIS [Abstract]. (Eng.) Cotton, P. B.; Denyer, M. E. (Middlesex Hosp., London W. 1, England). *Gastroenterology* 72(5, Part 2):1041; 1977.

7765 ELEVATED LUMINAL ENTEROPEPTIDASE ACTIVITY IN PATIENTS WITH PANCREATITIS OR CANCER OF THE PANCREAS [Abstract]. (Eng.) Rinderknecht, H.; Nagaraja, M.; Adham, N. F. (Veterans Admin. Hosp., Sepulveda, CA). *Gastroenterology* 72(5, Part 2):1164; 1977.

7766 THE ULTRASONIC FEATURES AND EVOLUTION OF PANCREATIC PSEUDOCYSTS [Abstract]. (Eng.) Palasciano, G.; Pietri, H.; Aimino, R.; Gaeta, L.; Sahel, J.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1):76; 1977.

7767 ECHOGRAPHIC AND PANCREATOGRAPHIC FEATURES OF PANCREATIC CYSTS [Abstract]. (Eng.) Sahel, J.; Pietri, H.; Palasciano, G.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146 (Suppl. 1):26; 1977.

7768 THE VALUE OF ECHOGRAPHY IN THE DIAGNOSIS OF ACUTE PANCREATITIS AND ITS SHORT AND LONG-TERM SEQUELS [Abstract]. (Eng.) Pietri, H.; Palasciano, G.; Aimino, R.; Silvestri, N.; Gaeta, L.; Bianchini, A.; Serafino, X. (Institut J. Paoli-I, Calmettees, 232 Bd e Sainte-Marguerite, Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1): 25; 1977.

7769 RESPECTIVE VALUE OF ULTRASONOGRAPHY AND ERCP IN ACUTE PANCREATITIS [Abstract]. (Eng.) Sahel, J.; Pietri, H.; Palasciano, G.; Silvestri, N.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1):25; 1977.

7770 PANCREATIC AND SALIVARY AMYLASE/CREATININE CLEARANCE RATIOS IN NORMAL SUBJECTS AND IN PATIENTS WITH CHRONIC RELAPSING PANCREATITIS [Abstract]. (Eng.) Hegarty, J. E.; O'Donnell, M. D.; McGeeney, K. F.; FitzGerald, O. (St. Vincent's Hosp., Dublin 4, Ireland). *Ir. J. Med. Sci.* 146(Suppl. 1): 28; 1977.

PANCREAS

7771 EVALUATION BY MEANS OF ERCP OF SURGICAL RESULTS IN CHRONIC PANCREATITIS (CP) [Abstract]. (Eng.) Sahel, J.; Sarles, J. C.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009, Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1): 36-37; 1977.

7772 SPLANCHNICECTOMY IN CHRONIC PANCREATITIS [Abstract]. (Eng.) Hureau, J.; Germain, M.; Avci, C.; Jost, J. L.; Roux, M. (Hopital de Vaugirard 389, rue de Vaugirard, 75015 Paris, France). *Ir. J. Med. Sci.* 146(Suppl. 1):41; 1977.

7773 RESULTS OF RESECTIONS FOR CHRONIC PANCREATITIS [Abstract]. (Eng.) Herzog, K. H. (Surgical Clinic, W.-Pieck-Univ., Rostock, E. Germany). *Ir. J. Med. Sci.* 146(Suppl. 1):49; 1977.

7774 PANCREAS DIVISUM. A SIGNIFICANTLY HIGHER INCIDENCE IN CHRONIC PANCREATITIS [Abstract]? (Eng.) Kruse, A. (Aarhus Kommunehospital, DK-8000 Aarhus C, Denmark). *Scand. J. Gastroenterol.* 12(Suppl. 45):52; 1977.

7775 PARTIAL OR TOTAL RESECTION IN TREATMENT OF CHRONIC PANCREATITIS [Abstract]. (Eng./Ger.) Botticher, R.; Muhe, E. (Chirurgische Klinik der Univ., Maximiliansplatz, D-8520 Erlangen, W. Germany). *Langenbecks Arch. Chir.* 345:584-585; 1977.

7776 ANASTOMOSING AND RESECTING OPERATIONS FOR CHRONIC RECURRENT PANCREATITIS: COMPARATIVE RESULTS [Abstract]. (Eng./Ger.) Scholze, H. (Chirurgische Klinik, rechts der Isar der TU, Ismaninger Str. 22, D-8000 Munchen 80, W. Germany). *L*
genbecks Arch. Chir. 345:584; 1977.

7777 PHENFORMIN AND PANCREATITIS [Letter to
Editor]. (Eng.) Ryan, L. M.; Hankwitz
P.; Banasiak, M. (Medical Coll. Wisconsin, Milwau
kee, WI 53226). *Ann. Intern. Med.* 87(6):796; 197

7778 INCIDENCE AND MORTALITY OF ACUTE PANCRE
ATITIS [Letter to Editor]. (Eng.)
Graham, D. F. (Broxburn, W. Lothian, Scotland).
Br. Med. J. 2(6102):1603; 1977.

7779 LACTOFERRIN RADIOIMMUNOASSAY: LEVELS
PURE PANCREATIC JUICE [Abstract]. (En
Fedail, S. S.; Harvey, R. F.; Salmon, P. R.; Rea
A. E. (Royal Bristol Infirmary, Bristol, England
Gut 18(11):A980; 1977.

7780 ENDOSCOPIC RETROGRADE PANCREATOGRAPHY
(ERCP) IN CHRONIC ALCOHOLISM [Abstract
(Eng.) Krarup, T.; Strandgaard, L.; Elsborg, L.
Reinicke, V. (Copenhagen County Hosp., Copenhage
Denmark). *Scand. J. Gastroenterol.* 12(Suppl. 45
48; 1977.

See also, 7375, 7377, 7453, 7458, 7466, 7484, 78
7892, 7922, 7935.

LIVER AND BILIARY TRACT

7781 HEPATIC SINUS CELLS (ENDOTHELIAL CELLS, KUPFFER CELLS, ITO CELLS, PIT CELLS WITH ENDOCRINE GRANULES): FUNCTIONAL CHANGES AND LESIONS IN HUMAN LIVER DISORDERS. (Fre.) Albot, G.; Parturier-Albot, M.; Reynes, P. (8, rue des Saints-Peres, 75007 Paris, France). *Ann. Gastroenterol. Hepatol.* 14(1):5-34; 1978.

An extensive review is presented of the role of the four cells found in the hepatic sinuses, but particularly the Kupffer cell, which is part of the mononucleated phagocyte system (reticuloendothelial system). The changes in the hepatic sinus cells observed in the human in the course of liver pathology such as excretory cholestasis, toxic hepatitis, viral hepatitis, and granulomatous hepatitis are described from their histological and functional aspects. The Kupffer cells have a dual function: (1) phagocytosis and intracellular digestion si
to that of other phagocytes and (2) specific pe
meability, permitting transfer to the blood of
stances metabolized in the hepatocytes.

7782 KIDNEY FAILURE DURING LIVER DISEASE.
SIGNIFICANCE OF ENDOTOXINS. (Ger.)
kinson, S. P. (King's Coll. Hosp. and Medical Sc
Denmark Hill, London, SE 5, England). *Z. Gastr*
enterol. 15(11):663-669; 1977.

The pathological mechanism of acute renal failu
occurring during liver cirrhosis, fulminant hep
failure due to acute viral hepatitis, halothane
hypersensitivity, or overdose of paracetamol is
discussed. Acute renal failure may occur with
tubular necrosis or without it (functional renal

ure). The underlying pathophysiological change
n intense renal and intrarenal vasoconstriction.
ence is presented that the vasoconstriction is
to systemic endotoxemia resulting from the
ure of the liver to filter out endotoxins ab-
ed from the gastrointestinal tract. Endotoxins
e renal vasoconstriction and glomerular and
tubular fibrin deposition by activating intra-
l coagulation. Acute tubular necrosis is in-
reted as the consequence of fibrin deposition;
osis of the renal cortex may also occur in
ous cases. In case of pronounced vasoconstric-
, acute tubular necrosis may also be the con-
ence of tissue anoxia. Acute renal failure
in obstructive jaundice has also been related
ndotoxemia, but, in contrast to cirrhosis and
inant hepatic failure, this is usually due to
ssociated gram-negative infection, and the
l failure almost invariably has the features
cute tubular necrosis. The findings indicate
the nature of the renal failure depends on
balance between vasoconstriction and fibrin
sition, which may be profoundly altered by
underlying liver disease.

HAPTOGLOBIN IN VARIOUS DISEASES: A REVIEW.

(Ger.) Heilmann, E. (Medizinische
klinik, Westfalische Wilhelms-Universitat, West-
3, D-44 Munster [Westf.], W. Germany). *Folia
atol. (Leipz.)* 104(5):608-618; 1977.

ies and observations on changes in the serum
oglobin (Hp) levels in various diseases are re-
ed. Increased serum Hp levels were found in
matoid arthritis, aplastic anemia, cholestasis,
alignant peptic ulcer, ulcerative colitis,
etic angiopathy, and during estrogen therapy
the use of oral contraceptives. Hemolysis,
loblastic anemia, and hepatocellular diseases
accompanied by reduced serum Hp levels. The
n Hp level is usually reduced in acute and
nic lesions of the liver parenchyma; there seems
e a correlation between the extent of the le-
and the serum Hp level. These findings sug-
that a disorder in protein synthesis is the
e of reduced Hp levels in inflammatory hepatic
esses. The determination of the serum Hp levels
elevant for the diagnosis of liver cirrhosis;
necrotic and portal cirrhoses are usually ac-
anied by subnormal Hp levels, while normal val-
are found in biliary cirrhosis. Especially
Hp levels are found in cirrhosis associated
splenomegaly. The Hp level is lowest in cryp-
nic portal cirrhosis, juvenile cirrhosis, and
chromatosis. The serum Hp level is usually
al in secondary liver carcinoma.

ULTRASTRUCTURAL MORPHOMETRIC INVESTIGATIONS ON LIVER BIOPSIES. THE INFLUENCE
RAL CONTRACEPTIVES ON THE HUMAN LIVER.

(Ger.)
, K.; Themann, H.; Verhagen, A. (Lehrstuhl
Medizinische Cytobiologie, Westring 3, D-4400
ter, W. Germany). *Arch. Gynaekol.* 223(3):205-
1977.

biopsy specimens from 12 healthy women who
had been using oral contraceptives (lynestrenol or ethinyl estradiol) for 2-76 months were investigated morphometrically according to Weibel's method. The stereological data obtained were compared with standard values for normal human liver biopsies. The volume density of the lysosomes per ml of hepatocytes showed a pronounced, significant ($p<0.001$) increase in the biopsy specimens from the probands. The cytoplasm was slightly enlarged, and the size of the cell nuclei reduced. The other parameters showed no substantial ultrastructural alterations of the liver following the use of hormonal contraceptives. Functional alteration cannot, however, be excluded.

7785 BENIGN HEPATIC LESIONS IN WOMEN TAKING ORAL CONTRACEPTIVES.

(Eng.) Davis, T. J.; Berk, R. N. (Presbyterian Hosp., 8200 Walnut Hill Lane, Dallas, TX 75231). *Gastrointest. Radiol.* 2(3):213-219; 1977.

Four cases of benign hepatic cell lesions in young women taking oral contraceptives are reported. The patients ranged in age from 23 to 41 yr and had taken oral contraceptives for 4 to 7 yr. In the first patient, focal nodular hyperplasia was discovered at exploratory laparotomy after a midepigastric abdominal mass was palpated during a routine physical examination. In another patient, focal nodular hyperplasia was found incidentally at pelvic exploration for a suspected ovarian tumor. The other two patients presented with abdominal pain and intraperitoneal bleeding; both patients had hepatic adenomas, and one also had focal nodular hyperplasia and a retention cyst. Angiography and radionuclide scanning aided in localizing and estimating the size of the liver lesions.

7786 IATROGENIC LIVER ABSCESSES: A COMPLICATION OF HEPATIC ARTERY LIGATION FOR TUMOR.

(Eng.) Jochimsen, P. R.; Zike, W. L.; Shirazi, S. S.; Pearlman, N. W. (Univ. Hosp., Iowa City, IA 52242). *Arch. Surg.* 113(2):141-144; 1978.

A review of six case histories of patients who developed intrahepatic pyogenic abscesses following therapeutic hepatic artery ligation and placement of intra-arterial catheters for infusion chemotherapy directed at primary or metastatic liver tumors was undertaken to assess the magnitude of the problem, produce future earlier recognition of the complication, and assess the adequacy of abscess management. In five of the six affected patients, the common hepatic artery was ligated just proximal to the gastroduodenal artery, which was used for the retrograde placement of the infusion catheter into the hepatic artery. In one patient in whom the left and right hepatic arteries had separate points of origin, each vessel was cannulated and ligated. The symptoms of fever, pain, and prostration are similar to those reported for hepatic abscesses of other etiologies. Laboratory confirmation of leukocytosis and impaired hepatic function may be obscured by myelosuppressive chemotherapeutic agents and an already severely damaged liver. Abnormal gas patterns in the area of the liver developed in all the patients and were often confirmed by ultrasound or by computed axial tomography. Both the reduced hepatic blood supply and the development of large amounts of nonviable tumor (the goal of the procedure) that act as a nidus for bacterial colonization predispose to the development of abscesses in these patients. It appears that cryptogenic abscesses with obscure etiologies arise from secondarily infected hepatic infarcts seeded by colon organisms via the portal vein. Antibiotic therapy alone is rarely effective, simple aspiration is not sufficient, and less-than-adequate surgical exploration results in multiple procedures. Treatment should always be surgical debridement and drainage. Abscesses tended to develop later than expected, usually after antibiotic prophylaxis was withdrawn, implying a causal relationship. Four of the six patients died (average survival from ligation, 348 days), and two are alive 378 and 102 days, resp., since ligation. These figures compare well with the average survival of 337 days from ligation among the 45/57 patients who died without developing abscesses and the 12/57 without abscesses who remain alive an average of 2 yr.

7787 INTRAHEPATIC PIGMENT AND CRYSTAL FORMS IN PATIENTS WITH CEREBROTENDINOUS XANTHOMATOSIS (CTX).

(Eng.) Salen, G.; Zaki, G.; Sabesin, S.; Boehme, D.; Shefer, S.; Mosbach, E. H. (East Orange Veterans Admin. Hosp., Tremont Ave., East Orange, NJ 07019). *Gastroenterology* 74(1):82-89; 1978.

Unique electron-dense bodies and crystal forms detected in the liver cells of two patients with cerebrotendinous xanthomatosis (CTX) are described. Histologic examination of plastic-embedded sections stained with toluidine blue demonstrated the presence of excessive dark pigment granules in the hepatocytes. Ultrastructural examination showed that this pigment was distributed widely throughout the hepatocytes and Kupffer cells and was in two forms. Amorphous electron-dense material was seen enveloped by the smooth endoplasmic reticulum or was found free-floating in the cytosol. Crystals were also found in the cytosol and resembled rhomboid-shaped bodies. The pigment resembles lipofuscin, especially in its osmiophilic stainability; yet because of its profuse and excessive deposition within the liver cells, it may be related to the basic biochemical defect in bile acid synthesis in CTX. The authors propose that the accumulation of such material may indicate the presence of nonmetabolizable bile alcohols resulting from a defect in bile acid synthesis.

7788 TRYPTOPHAN AND HEPATIC COMA. (Eng.)

Ono, J.; Hutson, D. G.; Dombro, R. S.; Levi, J. U.; Livingstone, A.; Zeppa, R. (Sch. Medicine, 1208-1 Usuki-Cho, Kagoshima City, 890, Kagoshima, Japan). *Gastroenterology* 74(2, Part 1):196-200; 1978.

To clarify the involvement of tryptophan (Trp) in the pathogenesis of hepatic coma, an investigation was carried out to elucidate the plasma factors responsible for the increased levels of Trp found in the cerebrospinal fluid (CSF) of patients in hepatic coma. Factors believed to be involved in the transport of Trp into the central nervous system were measured in 10 patients with liver cirrhosis and in stage III or IV hepatic coma, 10 patients with stable cirrhosis, and 10 healthy contr
Neither plasma total nor free Trp levels were sign
cantly altered in cirrhotic patients compared with controls, but in hepatic coma patients, the plasma free Trp level was significantly elevated (1.94 ±
µmol/dl) and the plasma total Trp level decreased
± 0.3 µmol/dl) compared with control levels (0.43
0.03 and 4.7 ± 0.5 µmol/dl, resp., $p<0.001$ and $p<0$
resp.). The CSF levels of Trp were significantly greater than normal in both patient groups ($p<0.00$
but were more elevated in the coma patients than i
the cirrhotics ($p<0.05$). Plasma free fatty acid levels were significantly elevated in both cirrhotics ($p<0.05$) and in hepatic coma patients ($p<0.001$) compared with controls, but were more elevated in the coma patients than in the cirrhotics ($p<0.001$). Serum albumin concentrations were significantly decreased in cirrhotics ($p<0.02$
but more significantly decreased in hepatic coma patients ($p<0.001$). The serum total bilirubin level was moderately elevated in cirrhotics (1.0-1.9 mg/dl) compared with controls (0.41-0.94 mg/dl
but markedly elevated in hepatic coma patients (1.5-67 mg/dl). Plasma branched chain amino acid (BCAA) levels were significantly lower than normal in both cirrhotics and hepatic coma patients ($p<0.$
$p<0.05$); isoleucine and leucine levels were also s
nificantly lower in the hepatic coma patients than
the cirrhotics ($p<0.01$ and $p<0.05$, resp.). No sig
ficant differences were found in the concentration
CSF BCAA in any of the groups compared. Among the aromatic amino acids, plasma phenylalanine, tyrosine (Tyr), and methionine (Met) were significantl
increased in hepatic coma patients ($p<0.01$, $p<0.00$
and $p<0.001$, resp.), but only Tyr and Met were significantly increased in cirrhosis without coma ($p<0.01$ and $p<0.001$, resp.). The CSF levels of these three amino acids were significantly higher in both patient groups ($p<0.001$-$p<0.05$), but no significant differences between the two groups were observed. The data demonstrate that, whereas the elevated CSF Trp levels in cirrhotics versus controls may be attributable to decreased plasma BCAA levels, the elevated CSF Trp levels in hepatic coma patients compared with stable cirrhotic patients may be attributable to increased plasma free Trp concentrations.

7789 SYMPTOMATIC NONPARASITIC LIVER CYSTS.

(Eng.) Hadad, A. R.; Westbrook, K. C.; Graham, G. G.; Morris, W. D.; Campbell, G. S. (Univ
Arkansas for Medical Sciences, 4301 W. Markham, Little Rock, AR 72201). *Am. J. Surg.* 134:739-744; 1977.

The cases of four women with symptomatic nonparasitic liver cysts are presented. The patients ranged in age from 49 to 80 yr. All presented with

bdominal mass. Radiologic studies demonstrated
lacement of the intraabdominal viscera by ex-
sic pressure in all cases, and a ^{99m}Tc liver
revealed filling defects in three patients.
ultrasound examination performed in three cases
ested a cystic mass, although the mass was ini-
ly thought to be a pancreatic pseudocyst before
ation in one patient. Surgical exploration re-
ed multiple cysts in three cases and a solitary
in the fourth. The largest cysts were mar-
alized, and the smaller ones were drained. Mi-
copic section of the cyst walls revealed fi-
s tissue, hepatocytes, aberrant bile ducts, and
ning of cuboidal and columnar cells. The re-
s in these patients and in others reported in
literature suggest that the diagnosis of liver
s can be established with routine and special
ologic studies; that laparotomy is indicated
patients with symptoms or uncertain diagnosis;
surgical management should be guided by cyst
, location, and content; and that definitive
ical treatment is indicated only for cysts
er than 10 cm.

CONGENITAL CYSTIC DILATATION OF THE INTRA-HEPATIC BILE DUCTS (CAROLI'S DISEASE).

.) In der Maur, G. A. P.; Zuidema, B. J. J.;
sma, S. A.; Blom, W. F. (Dept. Diagnostic Radi-
y, St. Geertruiden Ziekenhuis, Fesevurstraat
eventer, Netherlands). *Radiol. Clin.* 47(3):
189; 1978.

clinical features of Caroli's disease (seg-
ally dilatated intrahepatic bile ducts) are
ribed with reference to an affected 32-yr-old
n. The principal characteristics of the dis-
are segmental saccular or cystic dilatations
he intrahepatic bile ducts; predisposition to
iasis, cholangitis, and liver abscesses; and
of involvement of the other bile ducts and
bsence of liver cirrhosis and portal hyper-
ion. The symptoms consist primarily of some-
s colicky pain in the right upper quadrant, and
disease is generally diagnosed on the basis of a
perative cholangiogram. When Caroli's disease is
ected, echography can be a valuable diagnostic
. The disease is usually diagnosed in men and
n between 30 and 40 yr of age and is generally re-
ed as a grave condition because of its tendency
ead to serious complications (e.g., liver ab-
s, cholangitis, and sepsis). Its pathogenesis
bscure, but it is suspected that an embryonic
lopmental disorder in the wall of the bile ducts
es cysts via physiological periodic increases
ressure.

UPTAKE OF ^{99m}Tc-PYROPHOSPHATE IN LIVER NECROSIS.

(Eng.) Echevarria, R. A.;
nno, C.; Davis, D. K. (St. Petersburg General
, St. Petersburg, FL 33710). *Clin. Nucl. Med.*
:322-323; 1977.

case of a patient in whom the liver was visu-
ed on a routine bone scan performed with ^{99m}Tc-
phosphate is presented. The patient was a 77-yr-old diabetic man hospitalized for congestive heart failure. The bone scan was performed because the patient underwent resection of a rectal adenocarcinoma 2 yr previously. No skeletal metastases were demonstrable, but there was marked uptake of the radionuclide by the liver with an irregular central cold area. Forty-eight hours later, a ^{99m}Tc-sulfur colloid scan of the liver showed a similar liver image with a central defect of uptake and compensatory uptake of colloid by the vertebral and rib bone marrow. The patient died a week later, and at autopsy the liver showed a gross "nutmeg" appearance. There was a metastatic mass corresponding to the cold area of the scans. A few smaller metastases that had not been visualized were present. Severe centrilobular hemorrhagic necrosis was observed. The radionuclide is thought to have been taken up by the necrotic liver cells. The possibility that the necrotic liver may be consistently visualized by bone-seeking radionuclides deserves further exploration.

7792 HEPATIC TUMORS: POSSIBLE RELATIONSHIP TO USE OF ORAL CONTRACEPTIVES.

(Eng.)
Klatskin, G. (Dept. Medicine, Yale Univ., 333
Cedar St., New Haven, CT 06510). *Kurume Med. J.*
24(Suppl.):S1-S26; 1977.

The potential role of oral contraceptives in the pathogenesis of hepatic tumors was investigated in a survey of 105 cases reported in the literature since 1972, including 10 cases of malignant tumors and 95 cases of benign tumors (69 hepatic cell adenomas [HCA] and 26 cases of focal nodular hyperplasia [FNH]). While 53% of the patients had used oral contraceptives for more than 5 yr, 11% had used them for less than 1 yr. The estrogen in the contraceptive was mestranol in 87% of the cases and ethinyl estradiol in 13%. Except for the absence of cirrhosis, the clinical features of patients with malignant hepatic tumors associated with the use of oral contraceptives were similar to those that usually accompany such tumors. The benign tumors produced a wide variety of symptoms and many of the clinical and morphological features were significantly different in users of oral contraceptives compared with nonusers (138 cases of HCA; 234 cases of FNH). The presenting complaints, tumor size, and appearance for both HCA and FNH in contraceptive users and nonusers are summarized in detail. Functional, scintiscan, and arteriographic findings and the clinical course of the disease in contraceptive users are tabulated and discussed. A high survival rate (92%), remarkable tolerance to surgery, and a decrease in tumor size after discontinuation of oral contraceptive use were noted. The morphology of the tumors in contraceptive users is discussed at length and the possibility is suggested that the two types of tumors may be related in some cases. Evidence supporting a hormonal role in the pathogenesis of hepatic tumors and evidence suggesting that vascular changes in hepatic tumors reflect hormonal effects is presented. These facts may indicate that oral contraceptive use merely enhances the growth rate of small, otherwise unrecognized tumors. It is concluded that evidence implicating oral contraceptives in the pathogenesis of hepatic tumors is as yet circumstantial.

7793 HEPATOCELLULAR CARCINOMA AND HEPATITIS B.

(Eng.) Zuckerman, A. J. (London Sch. Hygiene Tropical Medicine, London WC1E 7HT, England). *Trans. R. Soc. Trop. Med. Hyg.* 71(6):459-461; 1977.

The relationship between hepatitis B (HB) and the pathogenesis of cirrhosis and primary hepatocellular carcinoma is reviewed briefly. The availability of specific laboratory tests for HB infection has demonstrated an excess prevalence of markers of active HB virus (HBV) infection in patients with primary liver cancer when compared with the general population; those markers are HB surface antigen (HBsAg) and its homologous antibody, HB core antigen (HBcAg) and its homologous antibody, and HBeAg. The cause and effect relationship is not clear: does the infectious agent drive the processes of macronodular cirrhosis and carcinoma or do these latter disease states predispose to greater susceptibility to HBV infection and the development of the carrier state? An early age of HBV infection such that the carrier state occurs most frequently in infants and children appears to be an important etiological factor in cirrhosis and carcinoma; it seems likely that persistent HBV infection occurs before the onset of chronic liver damage. Some progress is being made in demonstrating that HBV infection precedes the development of cancer, that tumor cells contain virus-specific molecules or antigens, that cancer cells can produce the virus, and that the virus can transform cells in culture or induce hepatocellular carcinomas in experimental animals. Much more work is required to elucidate the contributions of genetic, immunological, nutritional, and hormonal factors; mycotoxins; chemical carcinogens; other environmental factors; and HBV to hepatocellular carcinogenesis.

7794 HEPATOADENOMA AND FOCAL NODULAR HYPERPLASIA: PITFALLS IN RADIOCOLLOID IMAGING.

(Eng.) Salvo, A. F.; Schiller, A.; Athanasoulis, C.; Galdabini, J.; McKusick, K. A. (Maine Medical Center, Portland, ME 04102). *Radiology* 125(2):451-455; 1977.

The cases of three patients with hepatoadenoma or focal nodular hyperplasia in whom radiocolloid imaging was used in the diagnosis are presented. The patients were women, ranging in age from 39 to 45 yr, and two had been taking oral contraceptives. The first patient was asymptomatic, but had a right upper quadrant abdominal mass, which was palpable on routine examination. A ^{99m}Tc-sulfur colloid liver scan demonstrated that the inferior margin of the right lobe of the liver, in a position corresponding to that of the mass, was indented. At laparotomy, the tumor was found to be a well-demarcated but nonencapsulated smooth round mass composed of cords of uniform cells closely resembling normal hepatocytes. The cells were arranged in irregular trabeculae from one to five cells thick and were separated by sinusoids lined by endothelium and Kupffer cells. No portal tracts or bile ducts were present; tumor cell trabeculae around irregularly spaced venous channels occasionally were surrounded by areas of fibrosis. The second patient's only symptom was hepatomegaly, discovered at routine physical examination. Abdominal angiography revealed a massively enlarged right lobe with a hypervascular mass. The ^{99m}Tc-sulfur colloid scan showed irregularly shaped areas of decreased activity involving half the right lobe and a portion of the left lobe. At surgery, an attempt was made to remove a large vascular tumor in the lower half of the right lobe, but dissection revealed extension into the left lobe. Needle biopsy confirmed the diagnosis of hepatoadenoma. Extensions of the tumor were found, with multiple projections into normal liver across the surgical planes of dissection. Copious bleeding from the resection margin could not be controlled, and the patient died during surgery. At autopsy, the tumor was found to be similar to that in the first patient, except for a slightly lo ulated contour, a more pronounced increase in tumor cell glycogen content, and the presence of many randomly scattered necrotic foci. A liver mass was discovered in the third patient at hysterectomy. Postoperatively, a liver scan demonstrated a normal liver except for a slight increase in radioactivity in the central portion. At laparotomy, a diagnosis of focal nodular hyperplasia was made.

7795 CURRENT TREATMENT OF PRIMARY MALIGNANT HEPATOBLASTOMA IN CHILDHOOD (A SURVEY IN AUSTRIA).

(Ger.) Sauer, H.; Kurz, R.; Haas, H.; Mutz, I. (Kinderchirurgie, Universitat Graz, Heinrichstrasse 31, A-8010 Graz, Austria). *Z. Kinderchir.* 22(3):313-323; 1977.

The diagnosis and treatment of hepatoblastoma in 11 children are described. The patients included 6 boys and 5 girls aged 5 days to 15 yr; two-thirds of the patients were under 2 yr. Palpable liver tumor was the common symptom and anemia was found i five cases, but the other laboratory findings were unremarkable. The tumors were diagnosed by angiography, liver scanning, and sonography. The alpha-1-fetoprotein level was abnormally high in five of s ven investigated cases. The tumor was localized to the right lobe in five cases, to the left lobe in f and to both lobes in two. Embryonic hepatoblastoma was diagnosed in 10 cases and hepatocellular carcin in 1. Nine patients were in clinical stage II, and two were in stage III. Radical surgery was performed in 10 patients; it consisted of lobectomy or extended lobectomy in 9 and of segment resection in 1. Exploratory laparotomy was performed in two inoperable patients with bilateral involvement. Three patients also received postoperative radiotherapy. Six patients, including one irradiate patient, received postoperative chemotherapy wi cyclophosphamide (CP) or vincristine (VCR, one case each), with the combination of VCR, CP, and actinomycin D (AD), with VCR + CP + adriamycin + 5-fluorouracil (5-FU) or with VCR + CP + 5-FU.

ee patients developed metastases; two
recurrences. Three patients died after 8 months
5 yr; the others have been alive for 1 week to
yr (one of them has been alive with metastases
9 months).

6 INTRAHEPATIC HEMATOMA RESULTING IN OB-
STRUCTIVE JAUNDICE: AN UNUSUAL COMPLI-
ION OF LIVER BIOPSY. (Eng.) Chiprut, R. O.;
enwald, R. A.; Morris, S. J.; Zeppa, R.; Schiff,
R. (Veterans Admin. Hosp., 1201 N.W. 16th St.,
mi, FL 33125). *Gastroenterology* 74(1):124-127;
8.

case of a patient who developed obstructive
ndice as a complication of a liver biopsy is
sented. The patient, a 17-yr-old girl, under-
t the liver biopsy after a diagnosis of acute
e B viral hepatitis was made. The biopsy was
formed using the Menghini technique. The pa-
nt developed pain at the biopsy site and did
adhere to absolute bed rest. The patient ex-
ienced epigastric discomfort for 10 days after
procedure and then noted recurrence of ano-
ia and jaundice. She was readmitted 22 days
er the biopsy with a presumed diagnosis of re-
rent hepatitis. A ^{99m}Tc-sulfur-colloid liver
n revealed a large filling defect, and ultra-
ography of the liver was compatible with a di-
ed biliary tree without visualization of a
initive mass. A "skinny" needle percutaneous
nshepatic cholangiogram demonstrated a dilated
ht hepatic duct system with apparent blockage
the level of the bifurcation. The left hepatic
iary system was incompletely visualized. The
er enzymes and bilirubin level were elevated at
s time. Twenty-four hours after beginning par-
eral hydrocortisone therapy (for an allergic
ction to iodinated contrast material during an
empt to perform a hepatic arteriogram), the
um bilirubin level began to decrease. Six days
er, a rose bengal scan showed normal excre-
n of the material into the duodenum, and a re-
t ^{99m}Tc scan showed resolution of the defect.
patient was asymptomatic, although remaining
atitis B surface antigen-positive, at a follow-
examination 65 days after the liver biopsy. It
likely that an expansion of an intrahepatic
atoma caused compression of the biliary tree.
onset of pain at the biopsy site followed by
gastric pain are highly suggestive of the de-
opment of an intrahepatic hematoma following
er biopsy.

7 LIVER FINDINGS IN SJOGREN'S SYNDROME.
(Ger.) Rau, R. (Stadtspital Triemli,
mensdorferstrasse 497, 8063 Zurich, Switzerland).
xis 66(45):1437-1441; 1977.

dies on the hepatic involvement of the liver in
gren's syndrome (SS) are reviewed. Hepatomegaly
been reported in 10-20% of the patients with
Increased alkaline phosphatase activity was
nd in about 25%, increased amino transferase ac-
ities in 10-20%, and pathological BSP test in
50% of the patients. These changes are indicative of an impaired liver function. Abnormal thymol and cephalin flocculation tests are due to hypergammaglobulinemia, which is very common in SS. Antibodies to mitochondria and smooth muscles are markedly more frequent (8-12%) in SS than in rheumatoid arthritis or seronegative arthropathies. Liver biopsy specimens show lymphocyte and, rarely, plasma cell infiltration of the portal fields. Primary biliary cirrhosis and chronic active hepatitis are more frequent in SS than in the general population. Conversely, symptoms of SS were found in about 40% of the patients with chronic active hepatitis, and in 70-100% of the patients with primary biliary cirrhosis. The findings indicate that autoimmune liver disease is a systemic manifestation of SS.

7798 HEPATIC ANGIOGRAPHY IN HEREDITARY HEMORRHAGIC TELANGIECTASIA. (Eng.) James, P.; Delany, D. (Dept. Radiology, Univ. North Carolina, Chapel Hill, NC 27514). *Gastrointest. Radiol.* 2(2):149-152; 1977.

The cases of three patients with gastrointestinal bleeding and characteristic radiologic findings of hereditary hemorrhagic telangiectasia are presented. The first two patients, a woman and her mother, developed symptoms at 41 and 49 yr of age, resp.; the third patient was a 58-yr-old man. The first patient underwent an upper gastrointestinal examination shortly before presentation that showed normal results. However, a chest x-ray demonstrated mild cardiomegaly and generalized pulmonary vascular prominence, and celiac and superior mesenteric angiography demonstrated diffuse arteriovenous shunting throughout the liver. Endoscopy revealed gastric mucosal telangiectasia, although a biopsy was reported to be normal. Visceral angiography in the first patient's mother demonstrated diffuse hepatic arteriovenous fistulas and an angioma of the right colon. Histologic features of the liver included minimal portal fibrosis and prominent subcapsular vascular spaces, but it was otherwise normal. Visceral angiography was prompted in the third patient by the presence of a loud systolic bruit in the epigastrium. Celiac and renal artery stenosis in addition to massive generalized hepatic arteriovenous fistulization were demonstrated. The liver biopsy was normal. These cases demonstrate that the chest radiograph may show a chronic mild hyperdynamic state in hemorrhagic telangiectasia and that the liver biopsy results may be unremarkable in contrast to the angiographic results.

7799 SIDE-EFFECTS OF α-METHYLDOPA ON THE LIVER. (Ger.) Goischke, H. K. (Hoher Rand 3, DDR-8020 Dresden, E. Germany). *Z. Gesamte Inn. Med.* 33(3):87-88; 1978.

7800 METABOLIC LIVER DISEASE OF CHILDHOOD. (Eng.) Kane, W. J.; Sharp, H. L. (Univ. Minnesota Health Sciences Center, Minneapolis, MN). *Pediatr. Ann.* 6(5):61-86; 1977.

7801 INDUCTION OF ANTIBODY-DEPENDENT HEPATOCYTE CYTOTOXICITY BY CHRONIC ACTIVE LIVER DISEASE SERUM, MEDIATED BY NORMAL NULL CELLS [Abstract]. (Eng.) Kawanishi, H.; MacDermott, R. P. (Univ. Michigan Medical Sch., Ann Arbor, MI). *Gastroenterology* 72(5, Part 2):1078; 1977.

7802 EVIDENCE FOR A GENETIC CONTRIBUTION TO CELL MEDIATED CYTOTOXICITY (CMC) IN CHRONIC ACTIVE LIVER DISEASE (CALD) [Abstract]. (Eng.) Vogten, A. J. M.; Summerskill, W. H. J.; Shorter, R. G.; Opelz, G. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 72(5, Part 2):1145; 1977.

7803 "EMPTY" NUCLEI OF HEPATOCYTES IN HEPATOCEREBRAL DYSTROPHY AND OTHER DISEASES. (Rus.) Makarova, V. A.; Zus', B. A.; Maslovskaia, I. V.; Reiskanen, A. V.; Loginova, L. V.; Shulutko, B. I. (Leningrad Inst. Medicine Hygiene, Leningrad, USSR). *Arkh. Patol.* 38(7):45-52; 1976.

7804 ASSOCIATIONS OF DISEASES INVOLVING THE LIVER, GALLBLADDER, AND PANCREAS. (Ger.) Pusch, H. J.; Roschlau, T. (Medizinische Universitats-Poliklinik, Klinikstrasse 8, 8700 Wurzburg, W. Germany). *Therapiewoche* 27(48):8732-8741, *passim;* 1977.

7805 ABSCESS OF THE LIVER. (Fle.) Eyskens, E.; Timmermans, U.; Vanderputte, S. (Universitaire Instelling Antwerpen, Universiteitsplein 1, B-2610 Wilrijk, Antwerp, Belgium). *Acta Chir. Belg.* 76(4):407-415; 1977.

7806 HEPATIC ABSCESSES, BOTH INTRA- AND EXTRAHEPATIC. (Eng.) DeBakey, M. E.; Jordan, G. L., Jr. (Baylor Coll. Medicine, Houston, TX). *Surg. Clin. North Am.* 57(2):325-337; 1977.

7807 CRYPTOGENIC PYOGENIC LIVER ABSCESS. (Nor.) Solheim, K.; Gronmark, T.; Evensen, K. A.; Nerdrum, H. J. (Telemark Sentralsjukehus, Skien, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):9-11; 1978.

7808 PRIMARY LIVER CANCER IN A 17-YEAR-OLD WOMAN. (Rus.) Martynov, G. V. (Regional Hosp. No. 1, Ul'ianovsk, USSR). *Vopr. Onkol.* 23 (9):85-86; 1977.

7809 DIAGNOSIS OF PRIMARY LIVER CANCER. (Cze.) Pejchl, S.; Pejchlova, J. (II. Interni klinika fakulty detskeho lekarstvi KU, Prague, Czechoslovakia). *Cesk. Gastroenterol. Vyz.* 30(1): 47-51; 1976.

7810 DIAGNOSIS OF CARCINOMA OF THE BILIARY
TRACT AND THE PANCREAS--WITH SPECIAL REF
ERENCE TO THE ROLE OF CHOLANGIOGRAPHIC STUDIES [Ab
stract]. (Eng.) Naito, Y.; Nakazawa, S. (Nagoya
Univ. Sch. Medicine, Nagoya, Japan). *Gastroentero*
Jpn. 12(1):86; 1977.

7811 SIGNIFICANCE OF LIVER SCINTIGRAPHY IN TH
LOCALIZATION OF TUMOROUS LESIONS OF THE
PARENCHYMA. (Ger.) Bekier, A. (Kantonsspital, CH-9006 St. Gallen, Switzerland). *Therapiewoche* 27(46):8274-8280, *passim;* 1977.

7812 HEPATIC METASTASIS OF DIGESTIVE CARCINOI
TUMORS. (Eng.) Murat, J. (Centre Hospi
talier-Universitaire, Tours, France). *Chir. Gastr*
enterol. 10(3):281-295; 1976.

7813 INTRAHEPATIC CHOLESTASIS WITH LYMPHOGRAN
ULOMATOSIS. (Nor.) Bjorneklett, A.; Astor, T.; Elgjo, K. (Medisinsk avdeling A, Rikshospitalet, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):13-14; 1978.

7814 CHOLESTEROL STORAGE DISEASE OF THE LIVER IN CHILDHOOD. (Ger.) Keller, E.; Kunnert, B.; Braun, W. (Universitats-Kinderklinik, Oststr. 21, DDR-705 Leipzig, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(5/6):231-236; 1977.

7815 HEPATIC COMA: ITS CAUSES, DIAGNOSIS, AN
TREATMENT. (Ger.) Zipprich, B.; Nilius
R.; Otto, L.; Busse, H. J. (I. Medizinische Univer
sitatsklinik, Leninallee 22, DDR-402 Halle [Saale]
E. Germany). *Z. Gesamte Inn. Med.* 32(12):259-265;
1977.

7816 THERAPY OF HEPATIC ENCEPHALOPATHY AND HEPATIC COMA. (Ita.) Pagliaro, L.; Le Moli, S.; D'Amico, G. (Istituto di Semeiotica
Medica, Palermo, Italy). *Fegato* 23(1):83-100; 197

7817 RECENT DATA ON THE TREATMENT AND PATHOGENESIS OF HEPATIC COMA. (Ita.) Casciani, C. U.; Ancarani, E. (Cattedra di Semeiotica Chirurgica III, Universita, Rome, Italy). *Recent. Prog. Med. (Roma)* 63(2):196-211; 1977.

8 HEPATIC COMA IN OCCLUSIVE MESENTERIC INFARCTION. (Ger.) Duker, E.; von Gais-
g, U.; Heinkel, K. (Krankenhaus Bad Cannstatt,
essnitzweg 24, D-7000 Stuttgart 50, W. Germany).
ch. *Med. Wochenschr.* 119(44):1429-1430; 1977.

9 ACUTE HEPATIC INSUFFICIENCY IN CONGESTIVE HEART FAILURE. (Fre.) Vo Huu Tri; Schein-
, N.; Thomas, M. (Hopital Saint-Antoine, 184,
du Faubourg Saint-Antoine, F 75571 Paris Cedex
12, France). *Ann. Med. Interne (Paris)* 128(12): 965-968; 1977.

See also, 7485, 7486, 7487, 7488, 7491, 7496, 7634, 7639, 7643, 7826, 7841, 7855, 7859, 7861, 7862, 7885, 7909, 7911, 7927, 7934, 7935, 7936, 7941, 7942, 7943, 7948, 7949, 7952, 7956, 7957, 7970.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

) THE BRONZE BABY SYNDROME: A COMPLICATION OF PHOTOTHERAPY. (Ger.) Radermacher,
.; Noirfaise, A.; Hornchen, H.; Maier, R. D.;
lke, K. H. (Abteilung Kinderheilkunde, RWTH,
hestr. 27-29, 5100 Aachen, W. Germany). *Klin.*
iatr. 189(5):379-384; 1977.

emature twin baby (birth weight 800 g) with
ncreased bilirubin level (3.5 mg/100 cm^3) and
out kernicterus underwent phototherapy (3,700
150 W, wavelength 390-490 nm) beginning
diately after birth. The total serum bilirubin
l rose to 10.5 mg/100 cm^3 on the 6th day of
during the treatment, and dropped to 8.5 mg/
cm^3 on the 8th day. This increase was ac-
anied by an intense greyish-brown discoloration
he skin, serum, urine, peritoneum, spleen,
r, urinary bladder, pericardium, and visceral
ra. An increased coproporphyrin level was
d in the serum. The patient died from hyalini-
on of the lungs, kidney failure, and consumption
ulopathy on the 11th day of life. The bili-
n breakdown products, present in high concen-
ion, may exert neurotoxic effects, because
are not eliminated adequately by the normal
ary tract in bronze baby syndrome.

THE DUBIN-JOHNSON SYNDROME. (Fre.) Van de Velde, J. M.; Parent, M. (Notre-Dame
., P.O. Box 1560, Station C, Montreal, Canada).
n *Med. Can.* 106(12):1630-1634; 1977.

cases of the Dubin-Johnson syndrome are reported
atients aged 9, 15, 45, 50, and 56 yr. The syndrome can be differentiated from Gilbert's disease by the presence of conjugated bilirubin in the urine, hepatic pigmentation, and abnormal retention of BSP. The Dubin-Johnson syndrome must also be differentiated from the Rotor syndrome, which appears to be an attenuated form of the disease. Often, patients in the same families have one or the other of these latter two syndromes. Transmission of the Dubin-Johnson syndrome is probably by an autosomal dominant allele with feeble penetration. Prognosis is excellent, and only phenobarbital is recommended as treatment.

7822 HEPATIC JAUNDICE OF HEREDITARY ORIGIN. (Por.) de Magalhaes, A. F. N. (Ciencias Medicas da Universidade Estadual de Campinas, Sao Paulo, Brazil). *Arq. Gastroenterol.* 14(4):215-223; 1977.

See also, 7860.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

7823 ALLOPURINOL HEPATOTOXICITY: CASE REPORT AND LITERATURE REVIEW. (Eng.) Chawla, S. K.; Patel, H. D.; Parrino, G. R.; Soterakis, J.; LoPresti, P. A.; D'Angelo, W. A. (Queens Hosp. Center, 84-69 164th St., Jamaica, NY 11432). *Arthritis Rheum.* 20(8):1546-1549; 1977.

A case of allopurinol hepatotoxicity is reported, and the literature concerning this complication is reviewed. The patient was a 44-yr-old man with gouty arthritis who had been receiving 300 mg of allopurinol daily for 1 week prior to admission. At this time, he had a 3-day history of diplopia, left upper quadrant fullness, and pain. Hepatosplenomegaly was present, and the SGOT, alkaline phosphatase, and total bilirubin levels were 50 mU/ml, 98 mU/ml, and 1.8 mg%, resp. Liver biopsy revealed fatty changes, focal necrosis, and noncaseating granulomata with scattered eosinophils. The patient's symptoms improved promptly after allopurinol was discontinued, and the hepatosplenomegaly disappeared after 4 weeks. Six cases of allopurinol-induced hepatotoxicity have been reported, and the present case is the third with allopurinol-induced granulomatous hepatitis.

7824 HEPATITIS DUE TO HALOGENATED ANESTHETICS. (Fre.) Duheille, J. (Faculte A de Medecine de Nancy-Brabois, Boite postale n° 1080, 54019 Nancy Cedex, France). *Ann. Anesthesiol. Fr.* 17(3): 339-345; 1976.

The incidence of hepatitis following anesthesia with halothane is about 1 in 35,000. It can occur at any age, but the patient over 45 yr old is somewhat more susceptible, and the postmenopausal woman is a most likely candidate. Repeated exposure to halothane anesthesia has been incriminated etiologically, but hepatitis does occur after a single exposure. The hepatitis signs (fever, chills, rash, icterus) may appear within 4-17 days after anesthesia. The hepatitis can resolve spontaneously or progress to a fatal outcome. Biopsy or autopsy studies of the liver show pathology ranging from simple cholestasis to that resembling viral hepatitis or chronic active hepatitis. The mechanisms of hepatitis induced by halothane are discussed from the aspect of determining the susceptible patient prior to operation. Autoimmunization to liver components appears to be the most likely mechanism. Routine immunological testing, particularly for the antinuclear antibody with the Dane particle, although technically rather difficult, may serve to identify susceptible patients.

7825 ELEVATION OF SERUM XANTHINE OXIDASE ACTIVITY FOLLOWING HALOTHANE ANESTHESIA IN MAN. (Eng.) Giler, S.; Eshel, Y.; Pinkhas, J.; Ventura, E.; Levy, E.; Urca, I.; *et al.* (Tel-Aviv Univ. Medical Sch., Beilinson Medical Center, Petah-Tikva, Israel). *Experientia* 33(10):1356-1358; 1977.

The specific and highly sensitive marker for acut liver damage, serum xanthine oxidase (SXO), was used to clarify whether halothane or methoxyfluor is hepatotoxic in man. Of 60 patients without liver disease who were undergoing elective surger 31 received halothane (1.0%), 12 received methoxyfluorane (1.0% for 5 min, then 0.5% for remainder of operation), and 17 patients served as controls In controls (who received Fentanyl, 0.002 mg/kg and Alloferine, 0.2 mg/kg, i.v.), the mean SXO, l tate dehydrogenase (LDH), and SGOT values followi anesthesia were not significantly elevated, in co parison with the preoperative values. In the hal thane group, in comparison with the preoperative values, there was a significant elevation in SXO tivity immediately following completion of anesthesia, the activity increasing to maximum value on the 3rd postoperative day (>sixfold the preoperative value), and then decreasing gradually. SXO level was still significantly elevated on the 7th postoperative day, the last day it was measured. When the SXO levels on the different days following halothane anesthesia were compared with the respective values obtained in the contro group, a significant elevation was found immediately following anesthesia and on the 1st and 3rd postoperative days only. The post-halothane LDH and SGOT levels, which rose significantly whe compared with their respective preoperative value the former on the first ($p<0.01$), third ($p<0.001$ and fifth ($p<0.01$), the latter on the first (p<0. and third ($p<0.01$) postoperative days, did not differ significantly from the respective values following control anesthesia. The mean SXO level in the methoxyfluorane-treated patients was significantly elevated above the preoperative level only on the first postoperative day (almost fourf but when compared with the respective values following control anesthesia, no significant elevation was found at any time. LDH and SGOT levels were also not altered. These results suggest tha halothane, but not methoxyflurane, causes specifi hepatocellular damage.

7826 ENTERIC FEVER: A CLINICOPATHOLOGIC STU OF 104 CASES. (Eng.) Nasrallah, S. M. Nassar, V. H. (Emory Univ. Sch. Medicine, 69 Butl St., S.E., Atlanta, GA 30303). *Am. J. Gastroenter ol.* 69(1):63-69; 1978.

A clinicopathologic study of 104 cases of culture proven enteric fever was conducted to review the systemic manifestations and complications of the disease and to emphasize the frequency and signifi cance of liver involvement. One fatal case with disseminated intravascular coagulation is describ in detail. Clinical findings included fever (100 of cases), bradycardia (75%), splenomegaly (43%), hepatomegaly (33%), and rose spots (9%). The pri

al complications were anemia (64% of those test-
, typhoid hepatitis (30%, judged by combined
lirubin, SGOT, and SGPT values), relapse (12%),
l bleeding (occult, 12%; gross, 6%). The mean
lues of the abnormal liver tests included a total
lirubin of 8.1 mg%, an SGOT of 82 ImU, and an
T of 86 ImU. Liver enlargement occurred in one-
rd of the patients; however, 55% of all cases
h abnormal elevations of SGOT and/or SGPT showed
liver enlargement. Abnormal liver tests in four
seven patients with relapse indicate a rela-
nship between relapse and typhoid hepatitis.
these patients, the Kupffer cells were enlarged
hyperplastic. In all cases, pathology con-
ted of typhoid nodules of variable size and fre-
ncy depending on the severity of the condition.
fatal outcome of a rare complication of enteric
er, consumptive coagulopathy, is reported; early
ognition of this rare occurrence is vital. Most
the complications were reversible following
ibiotic therapy with chloramphenicol (the drug
choice) or Co-Trimoxazole.

7 HEPATIC INJURY DUE TO PYRIDINOL CARBAMATE.
(Eng.) Enat, R.; Barzilai, D.; Gellei,
(Rambam Medical Center, Haifa, Israel). *Isr.
Med. Sci.* 14(3):333-338; 1978.

7828 GRANULOMATOUS HEPATITIS IN A HEALTHY ADULT FOLLOWING BCG INJECTION INTO A PLANTAR WART. (Eng.) D'Alessandri, R. M.; Khakoo, R. A. (West Virginia Univ. Medical Center, Morgantown, WV 26506). *Am. J. Gastroenterol.* 68(4):392-395; 1977.

7829 A CLINICAL PHARMACOLOGIST'S VIEW OF DRUG HEPATOTOXICITY. (Eng.) Dujovne, C. A. (Univ. Kansas Medical Center, Kansas City, KS). *Pharmacol. Res. Commun.* 9(1):1-15; 1977.

See also, 7781, 7799.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

) ON THE LATE PROGNOSIS OF TYPE A VIRUS
HEPATITIS. (Eng.) Weigl, E.; Bach, H.
sp. Eisenhuttenstadt, DDR--122 Eisenhuttenstadt,
ermany). *Acta Hepatogastroenterol. (Stuttg.)*
):355-356; 1977.

prognosis of type A viral hepatitis was studied
,283 cases that occurred in one East German
between 1960 and 1970. Pathological sequelae
he acute disease developed in 8.2% of all these
s. Seventy-nine patients developed chronic
istent hepatitis, and five others developed
nic aggressive hepatitis. Acute viral hepatitis
ressed directly to cirrhosis in 6 patients, and
hol worsened the course of the disease in 10
ents. At the end of the observation period,
atients still showed pathological sequelae, and
e dead.

HB-Ab IN SWEAT. (Eng.) Telatar, H.;
Kayhan, B.; Kes, S.; Karacadag, S. (Gaz-
anposa, Hereke Sokak No. 4, Ankara, Turkey).
J. Gastroenterol. 68(5):492-493; 1977.

sweat of 10 patients with hepatitis B surface antigen (HBsAg)-positive liver cirrhosis and 20 patients with HBsAg-positive viral hepatitis was examined by radioimmunoassay for the presence of HBsAg. The sweat (1.5 ml) was collected, dried, and dissolved in 0.2 ml of buffer solution. The sweat from all patients was found to be HBsAg-positive. This study indicates that direct contact is one of the most important factors in the epidemiology of this disease and may be even more important in asymptomatic carriers.

7832 SIMULTANEOUS PRESENCE IN SERUM OF HBsAg AND ANTI-HBs OF DIFFERENT SPECIFICITIES. (Eng.) Moraczewska, Z.; Madalinski, K.; Holland, P. V. (Inst. Hematology, Warsaw, Poland). *Intervirology* 9(3):189-192; 1978.

The case of a patient in whom hepatitis B surface antigen (HBsAg) and antibodies to HBsAg (anti-HB) of different specificities were found in the serum during his third attack of acute viral hepatitis is presented. The patient had attacks of hepatitis 29 and 67 days apart. The presence of HBsAg was established by complement fixation and was found to be subtype *ayw*. The serum was checked against a panel of HBs antigens of *adw* and *ayw* subtypes. Precipitation reactions were obtained with all 12 HBsAg sera of subtype *adw* but not with any of the 8 HBsAg/*ayw* sera employed. Absorption of anti-HBs present in the serum sample, presumably monospecific anti-*d* antibody, was attempted. The patient's serum was absorbed with HBsAg/*adw*- or HBsAg/*ayw*-containing serum, and the results were compared to absorption with HBsAg-negative serum. Only the HBsAg/*adw* serum absorbed the anti-HBs from the sample. The patient's serum reacted only with HBs antigens that contained the *d* determinant, thus confirming it was a monospecific anti-*d* antibody. Electron microscopy showed no evidence of circulating immune complexes in the precipitate after centrifuging. These results indicate that both HBsAg of *ayw* specificity and monospecific anti-HBs/*d* antibody were present. This condition probably results from two infections with hepatitis B viruses of different subtypes--first *adw* and then *ayw*.

7833 NON-A NON-B HEPATITIS. (Eng.) Anonymous. (No affiliation given). *Br. Med. J.* 1(6118):942-944; 1978.

Current information on non-A non-B hepatitis is briefly reviewed. Studies on post-transfusion cases have shown that the mean incubation period is similar to that of hepatitis B, although it ranges from 18 to over 100 days. The clinical course is also similar to hepatitis B, but the symptoms, jaundice, and peak bilirubin and transaminase levels are more short-lived. The disease is thought to be spread by both parenteral and nonparenteral routes. The results of an inoculation study in which blood from asymptomatic blood donors implicated in transmitting post-transfusion hepatitis was inoculated into volunteers suggest that there exists a transmissible agent and a chronic carrier state in non-A non-B hepatitis, and this has been substantiated by studies in chimpanzees, in which there has been evidence of successful transmission. Two studies have shown that gammaglobulin is useful in preventing non-A non-B hepatitis. These studies also showed that 60-90% of post-transfusion hepatitis in the United States is currently non-A non-B and that it is transmitted mostly through commercial blood donations. An important obstacle to diagnosing non-A non-B hepatitis is the lack of a commercial kit for the diagnosis of hepatitis A antigen. A more direct method for the characterization of non-A non-B agent(s) by a serological test may soon be possible.

7834 VIRAL HEPATITIS. (Fre.) Cappel, R. (Institut Pasteur du Brabant, Brabant, Belgium). *Brux. Med.* 57(10):445-451; 1977.

7835 VIRAL HEPATITIS: PROGRESS AND PROSPECTS. (Ger.) Poley, J. R. (Department fur Kinderheilkunde der Universitat Ulm, Prittwitzstrasse 43, 79 Ulm [Donau], W. Germany). *Helv. Pediatr. Acta* 32(1):5-9; 1977.

7836 CURRENT PROGRESS IN THE AREA OF VIRAL HEPATITIS. (Ger.) Deinhardt, F.; Frosner, G. G. (Max v. Pettenkofer-Institut fur Hygiene und Medizinische Mikrobiologie, Pettenkoferstrasse 9a, D-8000 Munich 2, W. Germany). *Internist (Berlin)* 18(4):188-194; 1977.

7837 VIRAL HEPATITIS: PART 3. (Fre.) Lemaire, A. (37, avenu de Breteuil, 75007 Paris, France). *Ann. Gastroenterol. Hepatol.* 13 (5):479-486; 1977.

7838 HEPATITIS A. (Dut.) Zanen-Lim, O. G. (Laboratorium voor de Gezondheidsleer, Amsterdam, Netherlands). *Ned. Tijdschr. Geneeskd.* 121(45):1812-1815; 1977.

7839 SOME ASPECTS OF DIFFERENTIAL DIAGNOSIS OF ACUTE VIRAL, PHARMACOLOGIC, AND ALCOHOLIC HEPATITIS. (Rus.) Tareev, E. M.; Semendyaeva, M. E.; Mukhin, A. S.; Vinogradova, L. G. Blinkov, I. L. (I. M. Sechenov First Moscow Medical Inst., Moscow, USSR). *Vestn. Akad. Med. Nauk SSSR* (9):30-35; 1977.

7840 EXPERIENCE WITH THE DETERMINATION OF HBs-ANTIGEN (AUSTRALIA ANTIGEN) BY THE COMPLEMENT-BINDING REACTION. (Ger.) Reiske, J. (Bezirkshygieneinspektion und Bezirkshygieneinstitut Erfurt, Pfafferode 23, DDR-57 Muhlhausen, E. Germany). *Dtsch. Gesundheitsw.* 32(31):1453-1458; 1977.

7841 VALUE OF HEPATITIS B ANTIGEN IN THE DIFFERENTIAL DIAGNOSIS OF LIVER DAMAGE IN CHILDREN. (Rus.) Moskovskaia, I. A.; Alekhina, Z. S.; Zuev, P. D. (Second Children's Hosp., Tula, USSR). *Pediatriia* (7):77-78; 1977.

7842 EPIDEMIOLOGY OF VIRAL HEPATITIS. (Ita.) Giusti, G.; Piccinino, F.; Galanti, B.; Ruggiero, G. (Clinica delle Malattie Infettive, Universita di Napoli, Naples, Italy). *Fegato* 22 (1/2/3):47-96; 1976.

7843 ALIMENTARY HEPATITIS EPIDEMIC. (Ger.) Scholtze, H. K.; Ullmann, R.; Poch, M.; Schulze, B. (Bezirks-Hygiene-Inspektion, Prediger Str. 6, DDR-50 Erfurt, E. Germany). *Dtsch. Gesundheitsw.* 32(8):377-383; 1977.

7844 TRANSMISSION OF BACTERIAL AND VIRAL (HEPATITIS VIRUS B) INFECTIONS BY ENDOSCOPY OF THE UPPER GASTROINTESTINAL TRACT. (Dut.) Piette, M.; Elewaut, A. (No affiliation given). *Tijdschr. Gastroenterol.* 20(1):57-59; 1977.

See also, 7497, 7781, 7793, 7847, 7905.

Chronic Hepatitis

SERUM SOMATOMEDIN PEPTIDES MEASURED BY
SOMATOMEDIN A RADIORECEPTOR ASSAY IN CHRON-
VER DISEASE. (Eng.) Takano, K.; Hizuka, N.;
me, K.; Hayashi, N.; Motoike, Y.; Obata, H.
o Women's Medical Coll., Tokyo 162, Japan).
in. Endocrinol. Metab. 45(4):828-832; 1977.

somatomedin levels were determined, using a
omedin A radioreceptor assay, in 25 patients
liver cirrhosis, 28 patients with chronic
itis, and 131 healthy subjects. The levels
rmal subjects ranged from a mean of 1.00 ±
J/ml in those aged 20-29 yr to 0.80 ± 0.26
in those aged 60-86 yr. The mean level in the
otic patients (0.47 ± 0.05 U/ml) and that in
atients with chronic hepatitis (0.60 ± 0.04 U/
ere significantly lower than that in the normal
ols ($p<0.005$). The levels of somatomedin A
e patients with liver cirrhosis were lower
those in the patients with chronic hepatitis
<$p<0.1$). In the cirrhotic patients and the
nts with chronic hepatitis, there were posi-
correlations between the somatomedin level
ne (a) albumin level ($r=0.53$, $p<0.005$), (b)
nesterase level ($r=0.53$, $p<0.005$), (c) total
sterol level ($r=0.70$, $p<0.01$), and (d) thrombo-
($r=0.61$, $p<0.05$). There was a negative cor-
ion between somatomedin A and the indocyanine
retention test ($r=-0.50$, $p<0.05$). These re-
confirm earlier results obtained with bio-

CORE AND COAT OF THE HEPATITIS B-VIRUS AND
CYTOPLASMIC VIRUS-LIKE PARTICLES IN CHRON-
ATITIS: AN ELECTRON MICROSCOPIC STUDY. (Ger.)
y, G. (Laszlo Korhaz, Gyali ut. 5/7, 1097
st, Hungary). *Zentralbl. Allg. Pathol.* 121
450-455; 1977.

ght microscopic and electron microscopic
gs in liver biopsy specimens from a woman
ceived immunosuppressive therapy with corti-
oids and Imuran for chronic active hepatitis
esented. Round cell infiltration of the
connective tissue was seen. The inflamma-
nd necrotic changes were less marked than
the Imuran treatment. Isolated or clustered
haped formations with a diameter of 20-25 nm
) were found in the nucleus of nearly all
lial cells examined. Most of these particles
were localized near the nuclear membrane, sometimes in the pars amorpha. These particles were found to consist of osmiophilic granules 2-3 nm in diameter. Core particles were found only occasionally in the cytoplasm. Electron-dense filaments of varying length, and with a diameter of about 23 nm (surface antigen, coat) were found in the canaliculi of the smooth endoplasmic reticulum of the ground glass hepatocytes. Dane particles were not seen at all. Isolated spherical or ring-shaped virus-like particles with a diameter of 80 nm were found in some cells, mainly in the hyaloplasm; they may be due to a second virus infection. The immunosuppressive treatment is assumed to have played a certain role in the appearance of B virus components, because they were absent in the biopsy specimens taken before the immunosuppressive treatment.

7847 COMPARATIVE EPIDEMIOLOGICAL STUDIES OF CHRONIC AND ACUTE VIRUS HEPATITIS IN LENINGRAD (1964-1974). (Rus.) Shlyakhtenko, L. I.; Nechaev, V. V. (Leningrad Sanitary-Hygiene Medical Inst., Leningrad, USSR). *Vestn. Akad. Med. Nauk SSSR* (9):22-25; 1977.

7848 CHRONIC ACTIVE HEPATITIS. CONCEPTUAL, CLINICAL, AND IMMUNOLOGICAL CONSIDERATIONS ON 20 CASES. (Spa.) Trujillo Rodriguez, F.; Rubio, J. M.; Ruiberriz de Torres, R.; De La Vega, J. M.; Bolanos, A.; Holgado, C.; *et al.* (Hospital Universitario, Seville, Spain). *Rev. Esp. Enferm. Apar. Dig.* 49(6):719-728; 1977.

7849 CHRONIC HEPATITIS. (Ger.) Siede, W. (Zentrum der Inneren Medizin, Johann Wolfgang Goethe-Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt a. M. 70, W. Germany). *Therapiewoche* 27 (38):6568-6579; 1977.

See also, 7797.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

HISTOLOGICAL AND BIOCHEMICAL INDICES OF
PROGRESSIVE LIVER INJURY IN PATIENTS WITH
LIC FATTY LIVER. (Eng.) Van Waes, L.; Demeulenaere, L.; Lieber, C. S. (Bronx Veterans Admin. Hosp., Bronx, NY). *Acta Gastroenterol. Belg.* 40(7/8):271-277; 1977.

Histological and biochemical abnormalities that may be indices of progressive liver injury in patients with alcoholic fatty liver are reviewed. In long-term follow-up studies, 38-58% of patients who developed alcoholic hepatitis before the presence of fibrosis or cirrhosis rapidly progressed to cirrhosis. Studies in the baboon indicate that pericentral sclerosis in the absence of manifest alcoholic hepatitis is also a precursor lesion of cirrhosis. In some baboons, chronic alcohol feeding induced central sclerosis beginning at the fatty liver stage and invariably progressing to fibrosis or cirrhosis. Animals that did not develop the lesion did not progress beyond fatty liver. The fate of the lesion upon abstinence from alcohol remains to be documented. The use of blood transaminase levels as a biological marker of alcohol-induced liver disease is not satisfactory because the values are only moderately elevated in alcoholic hepatitis and do not reflect the degree of liver cell necrosis. Ornithine carbamyl transferase activity reflects liver cell necrosis more reliably than do the activities of transaminases, but its determination procedure is cumbersome. Persistence of elevated levels of plasma gamma-glutamyl transpeptidase (γ-GTP) despite abstinence from alcohol indicates underlying liver disease, but there are considerable overlaps between serum γ-GTP levels in patients with and without significant necrosis. Measurement of glutamate dehydrogenase (GDH) activity can discriminate between patients with and without alcoholic hepatitis, and falsely elevated levels in the absence of necrosis are uncommon in alcoholics. None of the enzyme activities reflects the stage of disease. Alcoholic hepatitis, pericentral sclerosis, and elevated GDH levels appear to be the most promising markers of progressive alcoholic liver injury.

7851 PLASMA AMINO ACID ABNORMALITIES IN THE ALCOHOLIC: RESPECTIVE ROLE OF ALCOHOL, NUTRITION, AND LIVER INJURY. (Eng.) Shaw, S.; Lieber, C. S. (Bronx Veterans Admin. Hosp., 130 W. Kingsbridge Rd., Bronx, NY 10468). *Gastroenterology* 74(4):677-682; 1978.

To evaluate the respective roles of alcohol consumption, nutrition, and liver injury in producing plasma amino acid abnormalities in the alcoholic, the levels of plasma amino acids were measured in 56 alcoholics with varying degrees of liver injury and nutritional status in 32 nonalcoholics with liver injury, and in 20 well-nourished nonalcoholic patients without history of liver or gallbladder disease. In addition, plasma amino acid levels were measured in baboons fed ethanol as 50% of total calories (a model system with precise dietary control). In 13 alcoholics with prolonged dietary protein deficiency (<56 g/day for >2 weeks), the levels of valine (val), leucine (leu), and isoleucine (isl) were significantly lower ($p<0.01$, $p<0.02$, and $p<0.05$, resp.) than in 15 alcoholics with short-term or no deficiency. In 12 alcoholics sampled after 1-4 days of abstinence, the level of α-amino-*n*-butyric acid (AANB) was significantly ($p<0.02$) increased, and there was a tendency toward increased levels of val, leu, and isl compared to 12 alcoholics of comparable nutritional status sampled after 5 or more days of abstinence. Consumption by three alcoholics of 2,000 kcal alcohol with an adequate diet for 2-4 weeks produced a significant increase in the levels of AANB ($p<0.001$) and isl ($p<0.05$) and marked increases in the levels of leu and val; 1-2 weeks after the withdrawal of alcohol, all the measured parameters fell to levels not significantly different from those of the initial control period. When plasma amino acid levels were measured longitudinally in baboons fed alcohol as 50% of total calories for up to 1-4 yr, the levels of branched-chain amino acids (BCAA) and AANB were slightly but significantly increased by 8-12 weeks ($p<0.02$ for leu and $p<0.001$ for AANB) and markedly increased by 27-47 weeks and 1-4 yr ($p<0.001$ at both times for both parameters). Moderate liver injury in either patients or baboons did not significantly affect plasma BCAA or AANB levels. In alcoholics with severe liver injury (cirrhosis and portal hypertension) who underwent nutritional repletion, there were significant decreases in the plasma levels of leu, isl, and val ($p<0.001$, $p<0.001$, and $p<0.01$, resp.) compared to alcoholics with minimal liver injury who underwent similar repletion. The results show that the plasma amino acid levels in alcoholics are affected by at least three factors: protein intake, alcohol consumptio and severity of liver injury.

7852 INTERNAL DISEASES AS SEQUELAE OF CHRONIC ALCOHOLISM. (Ger.) Stefenelli, N. (Krankenhaus, Hohensteinstrasse 68, A-3500 Krems, Austria). *Wien. Med. Wochenschr.* 127(18):565-569; 1977.

7853 EFFECTS OF CHRONIC ALCOHOLISM ON THE DIGESTIVE TRACT. (Fre.) Crismer, R. (Hopital de Briancon [Hautes-Alpes], 4, route des Guibertes, 05220 Le Monetier-Les-Bains, France). *Ann. Gastroenterol. Hepatol.* 13(2):83-100; 1977.

7854 ALCOHOLISM AND THE LIVER. (Ita.) Liebe C. S.; Leo, M. A. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY). *Fegato* 23(1):39-54; 1977.

7855 ALCOHOLISM IN ANAMNESIS AND LIVER MORPHOGY [Abstract]. (Ger.) Regele, H. (No affiliation given). *Wien Med. Wochenschr.* 127(12) 409; 1977.

7856 ALA DEHYDRATASE ACTIVITY OF ERYTHROCYTES IN CHRONIC ALCOHOLICS AND IN CIRRHOTIC ALCOHOLICS AND NONALCOHOLICS. (Ita.) Cambiaghi, G.; Duca, G. P.; Meroni, M. (Istituti Clinici di Perfezionamento, Milan, Italy). *Atti Accad. Med. Lomb.* 31(2):237-238; 1976.

See also, 7494, 7497, 7780, 7781, 7788, 7839.

Cirrhosis

57 PRIMARY BILIARY CIRRHOSIS IN MOTHER AND
DAUGHTER. (Eng.) Fagan, E.; Williams,
; Cox, S. (King's Coll. Hosp. and Medical Sch.,
ndon SE5, England). *Br. Med. J.* 2(6096):1195;
77.

e case reports of a mother and daughter in whom
vironmental factors seemed to play an important
rt in the pathogenesis of primary biliary cir-
osis are presented. The propositus, a 43-yr-old
man who had been in Singapore from 1964 to 1966,
esented with hepatomegaly and melena. She had
perienced abdominal discomfort and flatulence
ereafter and had noticed intermittent pruritus
nce 1974. Antinuclear antibodies, smooth muscle
tibodies, rheumatoid factor, cold agglutinins,
d hepatitis B surface antigen were not present.
ver biopsy showed a typical pattern of biliary-
pe cirrhosis. The patient's mother presented at
e age of 69 yr with melena. She complained of
vere long-standing Raynaud's phenomenon. She
d been separated from her daughter for 1 yr in
64, but she then rejoined her in Singapore in
65. Liver function tests were abnormal, and
rices were present. Over the next 5 months, she
veloped pruritus and further melena and hema-
mesis. Ascites and a cirrhotic liver were found
laparotomy, and the findings on biopsy were con-
stent with primary biliary cirrhosis. The patient
ed despite a portacaval shunt. Only the mother
d daughter in this family continued to live to-
ther, and this, together with the fact that they
esented with primary biliary cirrhosis within 5
of each other, suggests that an environmental
ctor, probably interacting with genetic compo-
ts, may have been of importance in initiating
e duct destruction.

8 INSULIN RESISTANCE AND BLOOD GLUCOSE RE-
PLACEMENT RATES IN LIVER CIRRHOSIS: STUD-
WITH ^{14}C-GLUCOSE. (Ger.) Adlung, J.; Kelch,
Peters, J.; Grazikowske, H. (Medizinische
hschule, Kronsforder Allee 71/73, D-2400 Lubeck,
Germany). *Z. Gastroenterol.* 15(9):553-564; 1977.

od glucose replacement and insulin resistance
e studied in 21 patients with inactive liver
rhosis, 8 patients with chemical diabetes, 11
ients with overt senile diabetes, and 35 normal
jects by the i.v. injection of 0.5 g/kg glucose
taining ^{14}C-labeled glucose. Impaired glucose
erance was found in 71% of the cirrhotic pa-
nts. The insulinogenic index was elevated in
patients with liver cirrhosis and normal glu-
e tolerance, and it was normal or below normal
those with carbohydrate intolerance, as well as
diabetics. The decrease in the specific activ-
of glucose, expressing the supply of nonlabeled
cose to the body pool, was much more rapid in
ients with carbohydrate intolerance, either
atogenic or not, than in carbohydrate-tolerant
ients when compared at equal glucose concentrations. Moreover, all patients with deteriorated glucose tolerance exhaled less $^{14}CO_2$ than did glucose-tolerant subjects. Consequently, diabetes in chronic liver disease displays the same abnormalities as diabetes in obesity with respect to liver glucose supply and glucose oxidation. In both conditions, diminished glucose assimilation is usually the result of reduced elimination and increased supply. Therefore, impaired hepatic uptake of glucose cannot be implicated as a single cause of hepatogenic diabetes.

7859 GROUP-SPECIFIC COMPONENT [Gc] LEVELS IN CHRONIC LIVER DISEASE. (Eng.) Mihas, A. A.; Hirschowitz, B. I. (Div. Gastroenterology, Univ. Alabama, Birmingham, AL 35294). *J. Med.* 9(2):109-115; 1978.

To elucidate the biologic function of group-specific component (Gc), serum Gc concentrations were measured by radial immunodiffusion in 72 patients with chronic liver disease and correlated with liver function measurements. Gc, an alpha-2-globulin (50,000 daltons) synthesized in the liver, is the proposed vitamin D transport protein. In all cases (liver cirrhosis, 28; metastatic liver disease, 15; chronic active hepatitis [CAH], 11; biliary tract disease, 18), diagnosis of liver disease was confirmed by needle biopsies. Liver function tests included measurements of the serum levels of bilirubin, SGOT, alkaline phosphatase, albumin, and bile acids (SBA). Low Gc values correlated with low serum albumin levels and high Gc levels correlated with high SGOT levels. An inverse relationship was observed between SBA and Gc levels, indicating possible Gc globulin involvement in bile acid transport. Patients with liver cirrhosis and those with metastatic liver disease showed significantly ($p<0.01$) lower serum Gc levels than did controls. Patients with CAH, without histologic evidence of established cirrhosis, had serum Gc levels significantly ($p<0.01$) higher than the control group (58.0 ± 6.0 versus 44.0 ± 6.0 mg/dl). When the biliary tract disease group was subdivided into patients with and without bone disease, all seven patients with severe bone disease were found to have significantly ($p<0.01$) lower serum Gc levels (27.0 ± 3.0 mg/dl) than did the controls. The authors suggest that low Gc values may decrease vitamin D_3 transport and so contribute to the osteodystrophy of obstructive liver disease.

7860 INCREASED FACTOR VIII COMPLEX AND DEFECTIVE RISTOCETIN-INDUCED PLATELET AGGREGATION IN LIVER DISEASE. (Eng.) Castillo, R.; Maragall, S.; Rodes, J.; Clemente, C.; Profitos, J.; Ordinas, A. (Hospital Clinico y Provincial, Barcelona, Spain). *Thromb. Res.* 11(6):899-906; 1977.

To elucidate the nature of hemostatic defects in liver cirrhosis, levels of the factor VIII procoagulant activity (VIII:C), the factor VIII-related antigen (VIIIR:AG), and factor VIII von Willebrand activity (VIIIR:WF) were assayed in 23 patients with advanced cirrhosis and in normal subjects. In 12 of these patients, the Ristocetin-induced aggregation of washed platelets in the presence of normal platelet-poor plasma (PPP) was also studied; in 5/12 patients bovine factor VIII-induced aggregation was studied. In normal subjects, the average plasma VIII:C level was 91.66 ± 22.97 U/dl, while in cirrhotic patients it was 147.56 ± 103.74 U/dl. The mean value of VIIIR:AG was 90.26 ± 25.05 U/dl in normal subjects and 633.04 ± 259.79 U/dl in cirrhotic patients ($p<0.001$). The mean value of VIIIR:WF was 330.00 ± 215.00 U/dl in cirrhotic patients compared to 104.93 ± 12.38 U/dl in normal subjects. The degree of correlation between the three variables was high in normal subjects ($r \sim 0.80$) but low in cirrhotic patients ($r \sim 0.1$). The initial velocity of the Ristocetin-induced aggregation of washed platelets with normal PPP was diminished in each case compared to the results obtained with a control system of normal platelets containing the same number of platelets. The bovine factor VIII-induced platelet aggregation, however, was normal. These data confirm that, in cirrhotic patients, the factor VIII elevation is an increase of the whole protein, most likely caused by hepatic damage, not merely a raising of the procoagulant activity.

7861 THE ROLE OF THE FALSE NEUROTRANSMITTERS, OCTOPAMINE AND PHENYLETHANOLAMINE, IN HUMAN HEPATIC ENCEPHALOPATHY.

(Eng.) Cangiano, C.; Calcaterra, V.; Cascino, A.; Fanelli, F. R.; Capocaccia, L. (III Clinica Medica, Policlinico Umberto I, Universita di Roma, Roma, Italy). *Rend. Gastroenterol.* 9(3):189-193; 1977.

To determine whether the accumulation of octopamine and phenylethanolamine (PEA) are involved in the etiology of hepatic encephalopathy, these false neurotransmitters were measured by a radioenzymatic assay in the plasma of healthy volunteers and in cirrhotic patients with and without encephalopathy. Octopamine levels were determined in plasma obtained from venous and arterial blood, whereas PEA was determined only in venous blood plasma. There were 23 normal subjects, 80 cirrhotic patients without liver coma, 27 cirrhotics who were in grades 1 or 2 hepatic coma, and 18 cirrhotics in grades 3 or 4 hepatic coma. Octopamine levels increased in the presence of chronic hepatic disease and at the onset and during the evolution of hepatic encephalopathy. In plasma from venous blood, the differences between the cirrhotic patients without coma and those in grade 1 or 2 hepatic coma ($p<0.005$) and between those in grade 1 or 2 and those in grade 3 or 4 coma ($p<0.001$) were statistically significant, whereas the difference between the healthy controls and the cirrhotic patients without coma was at the limit of the statistical difference ($0.1<p<0.05$). The octopamine level in plasma from arterial blood was significantly greater ($p<0.005$) in cirrhotic patients without coma than in the normal controls,
but no other significant differences were seen.
The mean arterial values of octopamine were hig
than those of venous measurements in all groups
except in patients in grades 3 or 4 hepatic com
There was a good correlation between the venous
PEA levels and the presence of liver cirrhosis
and grade of hepatic coma. Differences betweer
controls and cirrhotics without coma, between
cirrhotics without coma and those with grades
or 2 coma, and between those with grades 1 or
coma and those with grades 3 or 4 coma were al
significant ($p<0.05$, $p<0.05$, and $p<0.02$, resp.
There was a good correlation ($r=0.50$, $p<0.01$)
between venous ammonia and octopamine levels i
the 45 patients in whom these measurements were
taken simultaneously. These data indicate tha
plasma PEA and octopamine levels increase in
hepatic encephalopathy and that these increase
are correlated with the intensity and evolutior
the neurological disorders.

7862 HEPATIC ARTERIOPORTAL FISTULA RELATE A LIVER BIOPSY.

(Eng.) Baer, J. W.
(421 W. 113th St., New York, NY 10025). *Gastro*
intest. Radiol. 2(3):297-299; 1977.

A patient with hepatic artery portal fistula pr
senting with bleeding esophageal varices 5 mont
following a liver biopsy for cirrhosis is prese
The patient was a 52-yr-old alcoholic man with
vious evidence of cirrhosis and portal hyperter
A single pass with a 1.4-mm internal diameter
ghini needle was done. A sizeable portal vein
not identified in the specimen, although a port
triad and a central vein were seen. There were
immediate postbiopsy complications. Bleeding
ageal varices 5 months later were successfully
treated with pitressin. A celiac arteriogram
in preparation for a mesocaval shunt showed an
hepatic arterioportal vein fistula within the
lobe of the liver, enlarging the right branch
the portal vein. There was hepatopetal portal
within the liver. The main portal vein as wel
the branch to the left lobe of the liver were
visualized as a result of filling from the spl
vein on delayed films. The venous phase of th
superior mesenteric arteriogram showed filling
the main portal vein, the branch to the left l
and the umbilical vein sequentially. An end-t
portacaval shunt was performed since the intra-
hepatic portal vein was already "arteriolized,
but the patient did poorly because of closure
the shunt.

7863 SMALL NODULAR LIVER CIRRHOSIS WITH M PORTAL HYPERTENSION DUE TO VITAMIN A INTOXICATION RESULTING FROM PSORIASIS TREATMEN

(Ger.) Fleischmann, R.; Schlote, W.; Schomeru
H.; Wolburg, H.; Castrillon-Oberndorfer, W. L.
Hoensch, H. (Medizinische Universitatsklinik,
fried-Muller-Strasse, 7400 Tubingen, W. German
Dtsch. Med. Wochenschr. 102(45):1637-1640; 197

A 36-yr-old man developed small nodular liver
rhosis and marked portal hypertension with ble
esophageal varices 3.5 yr after a 7-week treat

th vitamin A (total dose 7 x 10^7 IU p.o., maximum
ily dose 1.2 x 10^6 IU) for psoriasis vulgaris.
ere was no increase in the serum vitamin A level
5 yr after the treatment, but increased deposits
vitamin A were found in the perisinusoidal lipid
orage cells (Ito cells) by fluorescence spectro-
otometry and electron microscopy of the liver
opsy specimen. Thoracoabdominal subdiaphrag-
tic fundectomy, resection of the lower seg-
nt of the esophagus, splenectomy, proximal
lective vagotomy, and pyloroplasty were per-
rmed. The patient is in good condition 2 months
ter surgery; the liver function tests are nearly
rmal.

64 THYROID FUNCTION IN CIRRHOTIC PATIENTS:
HORMONE BALANCE IN 24 PATIENTS WITH EDEMA-
US-ASCITIC DECOMPENSATION. (Fre.) Schmitt, B.;
ouretti, M. (Hopital Haut-Leveque, F 33604 Bor-
aux Pessac, France). *Nouv. Presse Med.* 6(35):
28-3229; 1977.

24 patients with cirrhosis accompanied by edema-
us ascites and decompensation, radioimmunoassays
re performed for circulating 3,5',3'-triiodothy-
nine (T3r), 3,5,3'-triiodothyronine (T3), thyrox-
e (T4), free thyroxine (IT4), and thyroid-stimu-
ting hormone (TSH). The values obtained were
mpared with established normal values. The levels
T3 were significantly lower ($p<0.001$) and the
vels of T3r significantly higher ($p<0.001$) in the
compensated cirrhotic patients; no significant
fference was observed in values for T4, IT4, or
H. There appears to be an alteration in the con-
rsion of T4 to T3 that causes an increase in
ripheral T3r at the expense of T3. This hormonal
dification is responsible for the symptoms of
pothyroidism observed in these cirrhotic patients.
is suggested that measurement of levels of T3 and
r may be used as a means of surveillance of pa-
ents under treatment for decompensated cirrhosis.

55 INTRAABDOMINAL BLEEDING FROM VARICEAL
VESSELS IN CIRRHOSIS. (Eng.) Shapero,
F.; Bourne, R. H.; Goodall, R. G. (Sunnybrook
ical Center, 2075 Bayview Ave., Toronto, Ontario,
ada). *Gastroenterology* 74(1):128-129; 1978.

The case of a cirrhotic patient who developed intraabdominal bleeding from variceal vessels is presented. The patient, a 39-yr-old alcoholic man, developed increased abdominal girth, abdominal pain, and stools positive for occult blood. At laparotomy, hemoperitoneum was present, and the bleeding was found to originate from variceal vessels in the peritoneum lateral to the ascending colon. Hemostasis was obtained with suturing, but the patient died postoperatively. Precipitous abdominal swelling associated with abdominal pain in a cirrhotic patient should alert the physician to the possibility of hemoperitoneum; it demands immediate paracentesis.

7866 DETERMINANTS OF ASCITIC FLUID PROTEIN IN CIRRHOSIS [Abstract]. (Eng.) Hoefs, J. (Dept. Medicine, Univ. Southern California, Los Angeles, CA). *Clin. Res.* 26(2):151A; 1978.

7867 HYDROCHLORIC ACID-INDUCED SECRETIN RELEASE, AND HALF-LIFE OF EXOGENOUS SECRETIN IN PATIENTS WITH LIVER CIRRHOSIS [Abstract]. (Eng.) Pelletier, M. J.; Chayvialle, J. A.; Descos, F.; Descos, L. (INSERM, U-45, Hopital Edouard-Herriot, 69374, Lyon, France). *Ir. J. Med. Sci.* 146(Suppl. 1):3; 1977.

7868 EFFECT OF AGE AND CIRRHOSIS ON THE DISTRIBUTION AND ELIMINATION OF CHLORDIAZEPOXIDE (LIBRIUM®) [Abstract]. (Eng.) Roberts, R. K.; Wilkinson, G. R.; Branch, R. A.; Schenker, S. (Vanderbilt Univ. Sch. Medicine, Nashville, TN). *Gastroenterology* 73(5):1243; 1977.

See also, 7481, 7487, 7494, 7495, 7506, 7782, 7788, 7797, 7831, 7845, 7877, 7905.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

59 PROSPECTIVE STUDY OF THE FIRST 197 ENDO-
SCOPIC RETROGRADE CHOLANGIOPANCREATICO-
PHIES PERFORMED IN BASEL (1973-1975). (Ger.)
noulli, R.; Faust, H.; Gyr, K.; Thurnherr, N.;
ishanslin, W.; Stalder, G. A. (Kantonsspital,
4004 Basel, Switzerland). *Schweiz. Med. Wochen-*
r. 107(37):1287-1291; 1977.

prospective evaluation of the first 197 endoscopic retrograde cholangiopancreaticographies (ERCP) performed in Basel during the 1973-1975 period is presented. It was possible to visualize the pancreatic duct, common bile duct, or both in 144/197 cases; the failure was due to the patient and/or instrument in 18/53 cases and to the examiner in 35. One hundred forty-two investigations were evaluable with respect to the definitive diagnosis. ERCP was correct in 101 cases, false in 10, and furnished additional information in 31 cases. Acute pancreatitis, chronic pancreatitis, pancreatic pseudocysts, choledocholithiasis, carcinoma and sclerosis of the papilla, carcinoma and stenosis of the bile ducts, fistula of the cystic duct, Caroli's disease, hepatitis, liver cirrhosis, functional disorders, villous adenoma of the duodenum, and other diseases were the definitive diagnoses in the 101 cases that were correctly diagnosed by ERCP. The early complications of ERCP included one lethal sepsis in obstructive jaundice, aggravation of chronic recurrent pancreatitis in two cases, and abdominal complaints in five. Insufficient distinction between acute and chronic pancreatitis was the main cause of disagreement with the final diagnosis in the 10 discordant cases. It is difficult to differentiate between chronic pancreatitis and pancreatic carcinoma. The examiner failure showed a declining tendency as the experience of the examiner increased. The findings indicate that ERCP should be limited to regional hospital centers, and be performed only in cases with well-defined indications.

7870 THERAPEUTIC ENDOSCOPIC RETROGRADE CHOLANGIOGRAPHY. (Ger.) Safrany, L.; Kautz, G.; van Husen, N.; Weitemeyer, R. (Reinhard-Nieter-Krankenhaus, D-2940 Wilhelmshaven, W. Germany). *Langenbecks Arch. Chir.* 345:267-273; 1977.

The results of endoscopic papillotomy performed in 545 patients were evaluated. The papillotomy was successful in 516 patients; they included 405 patients with choledocholithiasis, 97 with organic papillary stenosis, 12 with tumors (carcinomas, papillomas, and adenomyomas) of the papilla, and 2 with stones of the pancreatic duct. The complications included hemorrhage in 11 cases, retroperitoneal perforation in 10, pancreatitis in 6, cholangitis with incarcerated stone in 11, and incarceration of the Dormia cage in 2; laparotomy was necessary in 11 of these 38 patients. The mortality of the endoscopic papillotomy was 5/545; 4 patients died from cholangitis and 1 from pancreatitis. Advanced age, poor general condition, cholangitis, chronic pancreatitis, juxtapapillary diverticulum, and past Billroth II gastric resection are not contraindications of endoscopic papillotomy. It is becoming increasingly evident that endoscopic papillotomy is a valid alternative to reoperation in many cases of choledocholithiasis.

7871 A COMPARISON OF INTRAVENOUS AND INFUSION CHOLANGIOGRAPHY WITH INTRAOPERATIVE AND TOMOCHOLANGIOGRAPHY. (Ger.) Grauthoff, H.; Thelen, M.; Peters, M. (Radiologische Universitatsklinik, 5300 Bonn-Venusberg, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(6):575-577; 1977.

The diagnostic value of preoperative i.v. or infusion cholangiography (IC), intraoperative cholangiography (IOC), and additional tomocholangiography (TC) was studied in 72 patients with papillary stenosis (38), choledocholithiasis (16), and prepapillary stones (20). The intraoperative diagnosis of papillary stenosis was confirmed in 33/38 cases by IOC, in 28/38 cases by IC, and in 19/24 cases by TC. Choledocholithiasis was correctly diagnosed in 13/16 cases by IC, in 9/11 cases by TC, and in 9/16 cases by IOC. Papillary stenosis was diagnosed correctly in 15/20 cases by IC, in 9/16 cases by TC, and in 16/20 cases by IOC. The findings indicate that stenosis of the papilla is diagnosed most reliably by IOC. Intravenous and infusion cholangiography were of equal value; they each provided less information than did the intraoperative examination. IC was significantly better for the diagnosis of choledocholithiasis than was IOC, and tomography furnished no additional information. Stones of papilla are diagnosed most reliably by IOC, while preoperativ TC resulted in a loss of information.

7872 INDICATIONS FOR ENDOSCOPIC PAPILLOTOMY. (Eng.) Classen, M.; Ossenberg, F. W. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8 1976.* (Basel: S. Karger): 228-231; 1977.

Current knowledge concerning the indications for endoscopic papillotomy is reviewed, and the autho experience with this procedure is presented. A benign papillary stenosis was removed or at least improved by this procedure in all 10 patients in whom it was performed. Common duct stones were removed completely in 86% of 85 patients. Severe complications were observed in 5.6% of the patie who underwent endoscopic papillotomy. Although none died, a mortality rate of 1-1.5% has been su gested by other studies. The use of endoscopic papillotomy in the treatment of isolated papilla stenosis should be limited to cases in which the following have been demonstrated: clinical sign and laboratory diagnostics of cholestasis, radiological demonstration of enlarged extra- and int hepatic bile ducts, and increased duodenobiliary pressure gradient. The indications for the endoscopic removal of common duct stones are (1) retained or recurrent common duct stones after preceding operations or (2) patients who are high operative risks.

7873 BILIARY BACTERIOLOGY BASED ON INTRAOPE ATIVE BILE CULTURES. (Eng.) Delikari P. G.; Michail, P. O.; Klonis, G. D.; Haritopoul N. C.; Golematis, B. C.; Dreiling, D. A. (First Dept. Surgery, Univ. Athens, 66 Ipirou St., Athe 109, Greece). *Am. J. Gastroenterol.* 68(1):51-55 1977.

Bile cultures taken during 174 extrahepatic biliary tract operations were studied to examine the role of bacteria in postoperative infections and the factors involved in the development of septic complications. There were 45 positive bi cultures (26%). *Escherichia coli* was the most common organism, and was recovered in 21 cases; *Klebsiella* was second in frequency, being found 13 cultures. There was no sex predominance in the positive bile culture group, there being 22

and 23 women. There was an increasing per-
age of positive bile cultures with advancing
regardless of the underlying disease. The
est incidence of positive bile cultures oc-
ed in patients with acute cholecystitis (9/9
s), as compared with the incidence in chol-
sis (16/46) or with noncholestatic patients
119). Septic complications in the patients
a negative bile culture were rare (1.5%),
eas the rate among the patients with a posi-
culture was 33.3%. Since septic complications
be the result of intraoperative contamination
the infected bile, an argument is presented
prophylactic preoperative antibiotic adminis-
ion as well as for routine culture of bile
he time of surgery.

ERCP IN THE DIAGNOSIS AND MANAGEMENT OF
PERIAMPULLARY CARCINOMA. (Eng.) Salmon,
; Rey, J. F.; Baddeley, H.; Schiller, K. F.
Davies, J.; MacKenzie, E.; Read, A. E. *In:*
Sphincter of Oddi. Proceedings of the Third
oenterological Symposium, Nice, June 8-9, 1976.
l: S. Karger): 111-114; 1977.

ience with endoscopic retrograde cholangio-
eatography (ERCP) in the diagnosis of peri-
lary carcinoma is presented. Among 535
nts who underwent diagnostic ERCP between
and 1976, 14 patients were diagnosed as
g carcinoma, and this was confirmed in 11.
of the 11 patients had symptoms less than
ths, 5 less than 4 weeks, and 2 less than
ks. In addition, nine presented with jaun-
These facts suggest that the prognosis
d be good since an early diagnosis is
ble. In all cases the papillary and peri-
lary region were abnormal, the papilla being
ged and the site of an apparent malignant
. Five tumors were ulcerated. Pancreatico-
nectomy was performed in three patients, all
om are alive. The survival period was short
age, 8.5 weeks) in cases in which an internal
s procedure was performed.

A NEW ENDOPROSTHESIS FOR NONOPERATIVE IN-
TUBATION OF THE BILIARY TRACT IN MALIG-
BSTRUCTIVE JAUNDICE. (Eng.) Burcharth, F.
fte Hosp., Copenhagen, Denmark). *Surg. Gyn-*
Obstet. 146(1):76-78; 1978.

previously described method for percutaneous
epatic intubation under local anesthesia
vestigated in 19 patients having inoperable
y tract tumors or presenting as prohibitively
perative risks. The method is carried out
ing diagnostic percutaneous transhepatic
giography, and involves the insertion of an
osthesis under fluoroscopic control. A
ire is passed from a punctured peripheral
y duct into the biliary tract and manipulated
he obstruction into the duodenum. The endo-
esis, a radiopaque polyethylene catheter
ide holes, is pushed forward through the ob-
ion with an introducer until the distal end
ow the obstruction and the proximal end is
in the biliary tree above the obstruction. The introducer is connected to a catheter bag and left in the biliary tree for external drainage of bile. Twelve patients had inoperable malignancies, and their obstructive jaundice was treated palliatively with the endoprosthesis. Jaundice disappeared after 2 weeks in nine patients and decreased in five. Among the seven patients who underwent surgery, four still had jaundice when the operation was performed. In six patients with unresectable periampullary tumors, intubation was attempted but proved to be impossible due to advanced stenosis of the tumor. No patient showed signs of cholangitis, bile peritonitis, or bleeding. The median survival time in the 12 patients exclusively treated with endoprosthesis was 61 days. In all patients, jaundice recurred approximately 1 month before death. At autopsy, neither cholascos nor gallstones were found, and all endoprostheses were in the correct position and without sludge obstruction. With extended experience, the endoprosthesis may prove to be a worthwhile alternative to biliodigestive anastomoses in selected patients.

7876 RHABDOMYOSARCOMA OF THE BILE DUCTS. (Eng.) Nagaraj, H. S.; Kmetz, D. R.; Leitner, C. (Univ. Louisville Sch. Medicine, Louisville, KY 40201). *J. Pediatr. Surg.* 12(6):1071-1074; 1977.

The case of a child with a rhabdomyosarcoma of the bile ducts is presented. The patient, a 4.5-yr-old boy, had recurrent jaundice, fever, abdominal pain, and hepatomegaly. Ultrasonography of the liver disclosed hepatomegaly with probable dilatation of bile ducts. Two avascular areas close to the porta hepatis were demonstrated on selective celiac arteriography. An operative cholangiogram showed a small cystic duct and a dilated common duct that readily emptied into the duodenum. However, no dye could be refluxed into the proximal duct. Several soft yellow-tan polypoid masses were found in the common duct. The major portion of the tumor arose from the common hepatic duct, and the common duct, common hepatic duct, gallbladder, and cystic duct were resected. Ultrastructural examination of the tumor disclosed immature skeletal muscle fibers, exhibiting myofibril formation. A liver biopsy specimen showed biliary cirrhosis and was free of tumor. The distal part of the common bile duct was tumor-free. The patient has had no evidence of tumor or local recurrence for the past 9 months, during which time he has received alternate doses of vincristine and actinomycin D.

7877 SCLEROSING CHOLANGITIS AND PRIMARY BILIARY CIRRHOSIS--A DISEASE SPECTRUM? (Eng.) Fee, H. J.; Gewirtz, H.; Schiller, J.; Longmire, W. P., Jr. (Univ. California Los Angeles Sch. Medicine, Los Angeles, CA). *Ann. Surg.* 186(5):589-593; 1977.

A study was made retrospectively of 21 patients with primary sclerosing cholangitis (PSC) and 14 with primary biliary cirrhosis (PBC) in which there was absence of choledocholithiasis, previous bile duct surgery, malignancy, or cholestatic jaundice from drug or viral hepatitis and presence of progressive obstructive jaundice and of thickening and fibrosis in the affected intra- or extrahepatic system. The average age of onset was 40-50 yr in men and 20-40 yr in women with PSC and 50 yr in men and 40-60 yr in women with PBC. The major presenting complaints were jaundice and pruritus in PSC and pruritus, jaundice, abdominal pain, and lethargy in PBC. There were 47% and 21% men with PSC and PBC, resp., in this series. Laboratory findings in both diseases are similar: bilirubin and alkaline phosphatase levels are elevated (markedly in PSC and moderately in PBC), cholesterol levels were elevated in many patients, and eosinophilia was noted (in 7/21 PSC and 3/14 PBC patients). The distinction between PSC and PBC is often difficult; PSC had a slightly higher incidence of associated autoimmune disease, a greater hyperbilirubinemia (usually mixed), a more marked incidence of eosinophilia, and a more pronounced hypercholesterolemia. Of the 21 PSC patients, 3 had thyroiditis, 3 had ulcerative colitis, 1 had granulomatous colitis, and 6 had xanthomata; of the 14 with PBC, 1 had Hashimoto's thyroiditis, 2 had idiopathic myopathies, 1 had retroperitoneal fibrosis, and 1 had xanthalasma. Six of the 21 patients with PSC had associated, histologically proven PBC as well. Choleretics and cholestyramine were more effective than steroids or immuran in treatment. Treatment by T-tube drainage involved a considerable risk of infection, so that cholangitis was a frequent cause of morbidity. The prognosis of both PSC and PBC is usually grave and life expectancy difficult to determine; survival time did not correlate with initial laboratory findings or associated diseases. The mean time from symptoms to death was 9.5 yr and 2.5 yr in PBC and PSC, resp., and the causes of death were hepatic failure (4 in PBC, 3 in PSC), hepatorenal syndrome (1 in each disease), pericarditis (1 in PSC), cerebrovascular accident (1 in PSC), ascending cholangitis (1 in PSC), and unknown (1 in PBC). Etiologically, no organism was consistently found in the bile, and several samples were sterile. These two diseases may represent varying degrees of response to a common etiological agent.

7878 ABSORPTION AND METABOLISM OF CHENODEOXYCHOLIC ACID IN MAN.

(Eng.) v. Berge-Henegouwen, G. P.; Hofmann, A. F.; Thistle, J. L.; Schalm, S. W.; Cowen, A. E. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 157-159; 1977.

The pharmacokinetics of chenodeoxycholic acid were studied in healthy volunteers and in gallstone patients on regular chenodeoxycholic acid therapy. Intraduodenally instilled solutions of chenodeoxycholate were absorbed completely at loads varying from 25 to 400 mg in a 50-cm segment of jejunum. By gas-liquid chromatography, the concentration of unconjugated chenic acid in peripheral blood rose to a peak (10-50 μM) within 10 min. Chenic acid was also absorbed completely when administered p Hepatic chenic acid clearance was constant for doses from 25 to 400 mg. First-pass hepatic cle ance of chenic acid averaged 62% and was conside ably greater for chenyl conjugates. Chenic acid appeared in peripheral blood in the unconjugated form; it was rapidly conjugated in the liver and excreted into bile.

7879 DISSOLUTION OF GALLSTONES LEFT IN THE COMMON BILE DUCT.

(Ger.) Thiele, H. (Chirurgische Klinik, Klinikum Mannheim, Theodor Kutzer-Ufer, D-6800 Mannheim-1, W. Germany). *La enbecks Arch. Chir.* 344(2):123-129; 1977.

Conservative methods were used to remove residua gallstones from the common bile duct after chole cystectomy and inspection of the common bile duc in eight women aged 30-73 yr. Heparin infusion was used to dissolve the gallstones in six patients: complete dissolution was achieved in th cases, the dissolution of the stone was probable but not proved in one case, and the heparin infusion treatment was unsuccessful in two cases. Gallstones with high cholesterol content were di solved most easily. The gallstones were dissolv successfully in one patient by means of an ether chloroform mixture, but the treatment had to be stopped because of rausch. Treatment with hepar and sodium cholate was unsuccessful in one patie In case of failure, the stones were removed at relaparotomy.

7880 STONE DISSOLUTION AND THE NATIONAL COO ERATIVE GALLSTONE STUDY.

(Eng.) Scho field, L. J. (Cedars-Sinai Medical Center, 8700 Beverly Blvd., Los Angeles, CA 90048). *Am. J. Dig. Dis.* 22(12):1115-1116; 1977.

A progress report of the National Cooperative Ga stone Study (NCGS) is presented. The NCGS is a randomized, controlled, double-blind, cooperati clinical trial in which the primary aim is to determine the efficacy and safety of chenodeoxycholic acid (CDC) in gallstone dissolution. Its secondary aims are to identify specific determi of efficacy and safety, study the frequency and management of recurrence after dissolution, and investigate relevant basic mechanisms. Accessi of patients to the initial (liver biopsy) study was completed in 1976, at which time the main clinical study was initiated with Food and Drug Administration approval. This study includes 1 patients randomized to receive either 375 or 75 mg/day of CDC. These patients will undergo pre and post-treatment liver biopsies in addition t the same frequent clinical and laboratory patie safety monitoring procedures of the main study. In the main study, 900 patients will be randomi to receive either 375 or 750 mg/day of CDC or placebo. So far, about 500 patients have enter the main study. The NCGS, under careful scruti is progressing satisfactorily toward definitive conclusions regarding the efficacy and safety o CDC.

81 EFFECT OF INCREASED DIETARY FIBER ON BILI-
ARY CHOLESTEROL IN PATIENTS WITH GALL-
ONES. (Eng.) McDougall, R. M.; Walker, K.;
urston, O. G. (Univ. Alberta Hosp., Edmonton,
berta, Canada). *Surg. Forum* 28:416-418; 1977.

study the underlying mechanisms in cholesterol
olelithiasis, the effect of increased dietary
ber in the form of bran on biliary lipids, bile
id pool size, and individual bile acid ratios
s studied in seven patients with radiolucent
llstones in a functioning gallbladder and in
ne healthy volunteers. Bile specimens were col-
cted before and after a 4-week period, during
ich the subjects ate 50 g of a bran cereal daily
one or two servings. Initially, bile was super-
turated with cholesterol in the seven patients
d became unsaturated in all seven with increased
etary fiber ($p<0.02$). In controls, bile was un-
turated with cholesterol before and after bran.
e total bile acid pool was reduced in gallstone
tients as compared with that in controls and did
t change in either group with bran (mean pool
zes, 1.66 versus 2.51 g; $p<0.05$). The proportion
deoxycholic acid in the bile acid pool was in-
eased initially in patients with gallstones in
mparison with controls (mean 32.0 versus 19.0%;
0.05). The proportion of the bile acid pool
rmed by deoxycholic acid declined in both groups
th bran (gallstones, 32.0% to 22.9%; controls,
.0% to 17.0%; $p<0.05$ for the two groups combined).
e data indicate that increased dietary fiber in
tients with gallstones causes the return to an
saturated state of bile supersaturated with cho-
sterol. These data suggest that the reduced bile
id pool size seen in gallstone patients may be
e to impaired gallbladder function or bile dis-
acement by stones, since reduced pool size could
restored in the patients with gallstones by
patic bile acid synthesis.

2 ACUTE NON-CALCULOUS CHOLECYSTITIS IN BURNS.
(Eng.) Alawneh, I. (Stadt. Krankenhause,
acelsusstrasse 1-9, 3320 Salzgitter-Bad 51, W.
many). *Br. J. Surg.* 65(4):243-245; 1978.

en burned patients who developed acute chole-
titis were studied. The time of onset of symp-
s varied between 10 and 37 days after the in-
y. Jaundice was present in five patients, and
e cultures were positive in six patients. There
e six men and one woman; five patients were 28
40 yr old, and the other two were 56 and 69 yr.
lecystectomy was performed in all patients, and
patient died. It is suggested that the cause
post-burn cholecystitis is traumatic and septic
ck, with consequent biliary stasis.

3 CHOLESTASIS ASSOCIATED WITH CENTRAL IN-
TRAVENOUS NUTRITION IN INFANTS. (Eng.)
wn, M. R.; Putnam, T. C. (Genesee Hosp., 224
xander St., Rochester, NY 10467). *N.Y. State
Med.* 78(1):27-30; 1978.

case reports of two infants who developed severe intrahepatic cholestasis during central intravenous nutrition are presented. The first infant underwent a 20-cm ileal resection for atresia with meconium peritonitis (day 1 of life) but developed necrotizing enterocolitis by day 18. The second infant (1 kg; premature) did well until massive resection of the small intestine was required on day 37 of life for necrotizing enterocolitis. The first infant developed elevated levels of peripheral eosinophils, alkaline phosphatase, and bilirubin. Despite a change to p.o. diet, the bilirubin level increased, stools became acholic, tyrosine and then methionine levels became elevated, and biopsy revealed hepatocellular and canalicular cholestasis. He did not respond to phenobarbital (5 mg/kg/day for 1 week) or to cholestyramine (1 g/day) plus prednisone (5 mg/day) between day 57 and the 4th month of life, at which time the stools gradually became yellow and liver function tests returned to normal. During his 5th month, severe respiratory problems arose and he continued to have asthma and other allergic symptoms. The second infant had *Klebsiella* and *Candida* in tracheal aspirates before the institution of parenteral nutrition. When the liver and spleen became enlarged, p.o. feeding was reinstituted, but the patient developed recurrent apnea, persistent acidosis, hemolytic anemia, cardiovascular arrests, and elevated methionine and tyrosine levels. Phenobarbital (5 mg/kg, i.m.) did not lower the bilirubin level, and cholestyramine administration caused diarrhea. The infant died of cardiorespiratory arrest, and autopsy revealed micronodular cirrhosis with significant cholestasis and abnormalities in the lungs, brain, and kidneys. Cholestasis associated with parenteral nutrition in infants is probably multifactorial. Drug toxicity, bacterial toxicity, amino acid toxicity, and lack of bile flow stimulation may be possible causes.

7884 ENTEROBILIARY FISTULA AND ERCP. (Eng.)
Ghazi, A. (Beth Israel Medical Center, 10 Nathan D. Perlman Pl., New York, NY 10003). *Am. J. Gastroenterol.* 68(1):81-83; 1977.

A case of ascending cholangitis with a patent enterobiliary fistula in which endoscopic retrograde cholangiopancreatography (ERCP) gave useful diagnostic information is presented. The patient was a 60-yr-old woman who presented with right upper quadrant abdominal pain, nausea, vomiting, fever, and chills for 1 week. She had undergone gallbladder surgery 15 yr previously. Physical examination revealed a palpable right upper quadrant mass and jaundice. Gastrointestinal series revealed that no contrast material entered the biliary tract under fluoroscopic control, but lateral overhead films showed opacification of the biliary tree that revealed a common bile duct dilated to 1.5 cm. The cystic duct and gallbladder did not visualize. No calculi were demonstrated in the common bile duct. ERCP was carried out after the serum bilirubin level had increased from 1.4 mg% to 4 mg% and revealed an enterobiliary fistula with an opening located in the proximal portion of the second part of the duodenum. Cannulation through this opening revealed a common bile duct dilated to 2.5 cm, which contained several large calculi. The cystic duct and gallbladder again did not visualize. Exploratory laparotomy showed acute cholecystitis, cholelithiasis, choledocholithiasis, and choledochoduodenal fistula. A cholecystectomy was carried out, and all calculi were removed from the common bile duct. The T-tube was left in place. The patient made an uneventful recovery. The presence of air in the biliary system is not definite evidence of a well-functioning fistula and does not rule out intraductal biliary pathology. Demonstration of a fistula by barium reflux into the fistula's tract does not necessarily mean that all the pathology that is present within the ductal system has been demonstrated. Hence, ERCP is a useful diagnostic tool.

7885 HEPATOSPLENIC SCINTIGRAPHY IN CHILDREN WITH OBSTRUCTIVE JAUNDICE. (Eng.) Da-Costa, H.; Gandhi, R.; Deshmukh, S.; Puri, K.; Loken, M. (B.A.R.C. and K.E.M. Hosp., Parel, Bombay, India). *Clin. Nucl. Med.* 2(11):381-385; 1977.

Experience using hepatosplenic scintigraphy in 36 children with obstructive jaundice is summarized. Of 11 patients with extrahepatic biliary obstruction, all had choledochal cysts and three also exhibited extrinsic biliary atresia. Liver scans in patients with choledochal cysts showed less than normal radiocolloid radioactivity in the region of the porta hepatis. This finding persisted whether the cysts were palpable or nonpalpable. The left hepatic lobe tended to be prominent in this group of patients, such that the spleen was frequently indecipherable on radiocolloid scans from the abutting left lobe of the liver. ^{131}I-rose bengal (RB) studies were carried out in children suspected of either biliary atresia or choledochal cysts as suggested by the radiocolloid scintiphotographs. Only in two patients was the initially nonradioactive portal region subsequently seen to contain ^{131}I-RB; in both cases, this change was first noticed in the 7-hr scintiphotogram, suggesting that the zone was being gradually filled during the excretory phase and that the abnormality was located along the tract of the common bile duct. No choledochal cyst accumulated RB. The authors stress the necessity for correlation between clinical, laboratory, radiological, and scintigraphic findings.

7886 OBSTRUCTIVE JAUNDICE CAUSED BY HETEROTOPIC PANCREATIC TISSUE IN THE AMPULLA OF VATER. (Ger.) Hocht, B.; Kuhner, U.; Gay, B.; Arbogast, R. (Chirurgische Universitatsklinik, Josef-Schneider-Str. 2, 8700 Wurzburg, W. Germany). *Z. Kinderchir.* 22(1):79-82; 1977.

Obstructive jaundice due to heterotopic pancreatic tissue in the ampulla of Vater was diagnosed in a 2.75-yr-old girl. Transduodenal sphincterotomy was performed following initial conservative treatment. The patient recovered well. Ten months after surgery, transient signs of obstructive jaundice and pancreatitis appeared; they resolved quickly on conservative treatment. The patient has been sym tom-free for 3.5 yr after surgery.

7887 COURVOISIER'S GALLBLADDER IN CALCULOUS CHOLEDOCHAL OBSTRUCTION: ULTRASOUND AN ^{111}In-PHENOLPHTHALEXON STUDIES. (Eng.) Lin, M. Zatz, L. M.; Kosek, J. C.; Taylor, K. B. (Veteran Admin. Hosp., 3801 Miranda Ave., Palo Alto, CA 94304). *Clin. Nucl. Med.* 2(11):386-388; 1977.

The case of a patient with a distended gallbladde and calculous choledochal obstruction is presente The patient was a 65-yr-old man who had previousl undergone a portacaval shunt operation for decomp sated liver cirrhosis and a Billroth II anastomos for peptic ulcer disease. The patient presented with gastrointestinal bleeding due to an anastomo ulcer, which was oversewn; a bilateral truncal va gotomy was carried out at this time. Following surgery, the patient developed progressive hyperbilirubinemia. Gray scale ultrasonography and biliary scanning using ^{111}In-phenolphthalexon dem onstrated an enlarged gallbladder, suggesting an extrahepatic component in the cholestasis. Analy sis of the ^{111}In excreted in a series of fecal specimens showed a wide variation from high-activ ity dark feces to low-activity pale ones, compati with an intermittent choledochal patency suggesti of calculous obstruction. At autopsy, a 950-g ci rhotic liver (postnecrotic), a dilated common bil duct obstructed by a faceted juxta-ampullary sto and an unobstructed, dilated gallbladder containing stones and showing changes of chronic cholecystitis (mural fibrosis) were found. This case violates Courvoisier's law, which states that an enlarged gallbladder usually indicates a neoplast extrahepatic obstruction.

7888 SPONTANEOUS PERFORATION OF THE COMMON DUCT. (Eng.) Lipinski, J. K.; Gouws, Donald, J. C. (1105 Pandora Ave., 220, Victoria, British Columbia, Canada). *Ann. Surg.* 43(10):65 659; 1977.

Two cases of spontaneous perforation of the comm bile duct are presented, and cases in the literature are reviewed. The first patient, an 86-yr-old woman, presented with acute midabdominal pai distention, and bilious vomiting. There was marked tenderness in the right lower quadrant wi rebound tenderness. Bowel sounds were absent. clinical diagnosis of peritonitis from a rupture viscus was made, and at laparotomy, bile periton was seen. Most of the bile-stained fluid was in the upper abdomen with some inflammatory reactio in the area of the gallbladder and Hartmann's pouch. The gallbladder was full of stones, with a stone impacted in the area of the cystic duct. Dissection was carried out in the area of the triangle of Calot and along the common duct. A 5-mm free perforation of the common bile duct wa found. There was no evidence of stones in the common duct. Following cholecystectomy, a T-tub cholangiogram did not reveal obstruction or comm duct stones. The second patient was an 83-yr-ol woman who presented with anorexia, vomiting, and

dration. Marked right upper quadrant tender-
was present, and rectal examination revealed
acholic stool. Plain abdominal films showed
iple loops of small and large bowel with
ral air-fluid levels. At laparotomy, a large
tity of thick bile-stained fluid was noted.
gallbladder was thin-walled and covered with
rinous exudate but was otherwise normal.
n bile was pouring from a tear in the common
above the junction of the cystic and common
tic ducts. There was no evidence of calculi
eoplasm. A catheter was placed in the common
and a sump drain inserted into the subhepatic
and into the foramen of Winslow and brought
through the abdominal wall. Both patients re-
red following drainage of the duct and the
ounding area. The results of drainage in these
ents and in other patients with common bile duct
oration reported in the literature have been
ifying.

NECROTIZING VASCULITIS OF THE GALLBLADDER
AND THE APPENDIX: SIMILARITY IN THE
HOLOGY OF RHEUMATOID ARTERITIS AND POLYARTERITIS
SA. (Eng.) Fayemi, A. O.; Ali, M.; Braun, E.
oly Name Hosp., Teaneck Rd., Teaneck NJ 07666).
Gastroenterol. 67(6):608-612; 1977.

ases of two patients, one with rheumatoid ar-
is (RA) and the other with polyarteritis no-
(PN), who developed abdominal pain secondary
ecrotizing vasculitis of the gallbladder and
ppendix, resp., are described. The first pa-
was a 61-yr-old man who had been maintained
rticosteroids and butazolidin for RA for 3 yr.
inal pain in this patient was associated with
a and fever. A nonvisualizing gallbladder
oted on p.o. cholecystography, and a diagnosis
ronic cholecystitis was made. Cholecystectomy
erformed. The gallbladder contained viscid
ish bile and 15 strawberry stones. Microscop-
y, the mucosa and submucosa of this organ
d edema and sparse lymphocytic infiltrate. The
of the vessels showed focal fibrinoid necrosis
nfiltration of all layers of the wall by chronic
mmacory cells. Intimal thickening with luminal
wing and, rarely, thrombosis were found. There
ragmentation of the elastic laminas. The patient
3 days after surgery, after developing vomit-
diarrhea, shock, oliguria, and a temperature
.5 C. The second patient was a 48-yr-old man
eveloped acute abdominal pain on the 20th day
spitalization for progressive weakness; he
een treated for joint swelling and pain, which
een diagnosed as gout. The patient was ex-
d surgically for suspected appendicitis, and
dectomy was performed. Microscopically, the
diceal lumen was partially obliterated by fi-
tissue. There were no acute inflammatory
es within the wall. The blood vessels showed
noid necrosis of varying severity. The entire
ness of the vessels was infiltrated by chronic
mmatory cells containing many eosinophils.
esions were of different ages, the wall of
vessels having been replaced by acellular fi-
tissue. Recanalized thrombi were evident
me arteries, and the elastic laminas were
frequently fragmented. These cases illustrate the similarity between the vascular lesions of PN and RA.

7890 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY PRIOR TO RETROGRADE CHOLANGIOGRAPHY [Letter to Editor]? (Fre.) Elewaut, A.; Hendrix, R.; Hoste, P.; Barbier, F. (Akademisch Ziekenhuis, De Pintelaan 135, B-9000 Gand, Belgium). *Nouv. Presse Med.* 6(31): 2776-2777; 1977.

7891 COMMON BILE DUCT OBSTRUCTION SECONDARY TO INFECTION WITH Candida. (Eng.) Marcucci, R. A.; Whitely, H.; Armstrong, D. (Hines Veterans Admin. Hosp., Hines, IL 60141). *J. Clin. Microbiol.* 7(5):490-492; 1978.

7892 DIRECT ENDOSCOPIC VISUALIZATION OF THE BILE AND PANCREATIC DUCT SYSTEMS BY PERORAL CHOLANGIOPANCREATOSCOPY (PCPS). (Eng.) Nakajima, M.; Akasaka, Y.; Yamaguchi, K.; Fujimoto, S.; Kawai, K. (Kyoto Prefectural Univ. Medicine, Kawaramachi-Hirokoji, Kamigyo-Ku, Kyoto 602, Japan). *Gastrointest. Endosc.* 24(4):141-145; 1978.

7893 TYPE I HISTIOCYTOSIS X PRESENTING AS BILIARY ATRESIA: A CASE REPORT. (Eng.) Heitner, R.; Mouton, S.; Rabinowitz, L.; Rosen, E. U. (Baragwanath Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 53(19):768-770; 1978.

7894 TREATMENT OF CHOLESTEROL GALLSTONES WITH CHENIC ACID: A FOLLOW-UP STUDY OF 25 PATIENTS. (Eng.) Beker, S. (Escuela de Medicina Luis Razetti, Universidad Central de Venezuela, Caracas, Venezuela). *Am. J. Gastroenterol.* 68(5): 456-460; 1977.

7895 INTRAVENOUS CHOLANGIOGRAPHY IN THE DIAGNOSIS OF ACUTE CHOLECYSTITIS. (Eng.) Cheung, L. Y.; Chang, F. C. (Dept. Surgery, Washington Univ., 4960 Audubon Ave., St. Louis, MO 63110). *Arch. Surg.* 113(5):568-570; 1978.

7896 SERUM LEVELS OF CHENODEOXYCHOLIC ACID IN HEALTH AND NON-HEPATIC DISEASE: RELATIONSHIP WITH CHOLELITHIASIS. (Eng.) Schalm, S. W. (Academic Hosp. Dijkzigt, Rotterdam, Netherlands). *Acta Gastroenterol. Belg.* 40(11/12):406-407; 1977.

7897 GRANULAR CELL MYOBLASTOMA: A CAUSE OF BILIARY OBSTRUCTION. (Eng.) Zvargulis, J. E.; Keating, J. P.; Askin, F. B.; Ternberg, J. L. (St. Louis Children's Hosp., 500 S. Kingshighway, St. Louis, MO 63110). *Am. J. Dis. Child.* 132(1): 68-70; 1978.

7898 TOTAL EXCISION OF CHOLEDOCHAL CYST. (Eng.) Lilly, J. R. (Univ. Colorado Sch. Medicine, Denver, CO). *Surg. Gynecol. Obstet.* 146(2):254-256; 1978.

7899 SURGICAL TREATMENT OF ACUTE CHOLECYSTITIS. (Eng.) Ram, M. D.; Bergese, J.; Brown, H. W. (Huron Road Hosp., Cleveland, OH 44112). *Am. Surg.* 43(11):763-767; 1977.

7900 PRIMARY SCLEROSING CHOLANGITIS. (Eng.) Yague, S. (San Juan de la Cruz Hosp., Ubeda, Jaen, Spain). *Abdom. Surg.* 19(6):136-137; 1977.

7901 THE CASE OF THE COMMON DUCT CANCER. (Eng.) Seaman, W. B. (Columbia-Presbyterian Medical Center, New York, NY). *Hosp. Pract.* 12(12):55-56; 1977.

7902 RE-OPERATION OF THE CHOLEDOCHAL CYST. (Eng.) Nakamura, S.; Kimura, S.; Ishidoya, T.; Tamaki, Y. (Ehime Univ., Sch. Medicine, Shigenobucho, Onsengun, Ehime, Japan). *Z. Kinderchir.* 22(1):41-50; 1977.

7903 GALLSTONE DISEASE PRESENTING AS SEPTICAEMIC SHOCK. (Eng.) Faber, R. G.; Ibrahim, S. Z.; Thomas, D. M.; Beynon, G. P. J.; Le Quesne, L. P. (Middlesex Hosp. and Medical Sch., London, England). *Br. J. Surg.* 65(2):101-105; 1978.

7904 PRECURSORS FOR BILIARY STEROLS IN MAN [Abstract]. (Eng.) Lindblad, L.; Schersten, T. (Sahlgrenska Sjukhuset, Univ. Goteborg, Goteborg, Sweden). *Digestion* 16(4):344; 1977.

7905 ^{14}C-CHOLIC ACID TEST IN HEPATOBILARY DISEASE [Abstract]. (Eng.) Horak, W.; Knoflach, P.; Schuster, E.; Kemenesi, W. (Dept. Gastroenterology, Univ. Vienna, Vienna, Austria
Digestion 16(4):324-325; 1977.

7906 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGR
[Abstract]. (Eng.) Tytgat, G. (No
affiliation given). *Scand. J. Gastroenterol.* 1
(Suppl. 47):27-28; 1977.

7907 RISK OF ORAL AND INTRAVENOUS CHOLANGI
GRAPHY [Abstract]. (Eng.) Hafter, E
(No affiliation given). *Scand. J. Gastroentero*
12(Suppl. 47):24-25; 1977.

7908 ULTRASONIC DIAGNOSIS OF CHOLELITHIASI
(Eng.) Holt, R. W.; Wagner, R.; Homa
M. (Georgetown Univ. Medical Center, Washington
DC). *J. Pediatr.* 92(3):418-419; 1978.

7909 CANCER OF THE UPPER BILIARY JUNCTION.
(Eng.) Salembier, Y. (69, rue de la
Louviere, 59000 Lille, France). *Int. Surg.* 62
(11/12):616-618; 1977.

7910 ENDOSCOPIC PAPILLOTOMY AND REMOVAL OF
GALLSTONES. (Eng.) Demling, L. (Uni
Clinic, Erlangen, W. Germany). *J. R. Coll. Sur*
Edinb. 22(6):385-390; 1977.

See also, 7401, 7412, 7415, 7466, 7484, 7486, 7
7500, 7501, 7769, 7781, 7782, 7796, 7
7806, 7859, 7860, 7943, 7958.

GENERAL

7911 ENDOSCOPIC CONTROL OF MASSIVE UPPER GASTROINTESTINAL BLEEDING WITH A TISSUE ADHESIVE (MBR 4197). (Eng.) Martin, T. R.; Onstad, G. R.; Silvis, S. E. (Veterans Admin. Hosp., 54th St. and 48th Ave. South, Minneapolis, MN 55417). *Gastrointest. Endosc.* 24(2):74-76; 1977.

Experience with the use of a tissue adhesive (MBR 4197) in the control of upper gastrointestinal bleeding in nine critically ill patients who were not considered candidates for emergency surgery is presented. The case reports of six patients who were treated successfully by the endoscopic application of MBR 4197 are presented. This treatment was considered to be life-saving in three
tients, one who bled from ulcerated gastric can
and two who bled from esophagitis that was asso
ated with renal failure in one and prostatectom
in the other. These patients required 15, 16,
6 transfusions before treatment and 2, 2, and 0
after treatment, resp. The first patient requi
eight treatments, while the other two required
three. Two additional patients had no further
bleeding from esophagitis or duodenal ulcers bu
died of coexisting hepatic failure, and the las
patient rebled and exsanguinated from esophagea
varices. This uncontrolled study in critically
ill patients indicates that massive bleeding fr

rete and diffuse lesions of the upper gastro-
stinal tract can be controlled by the endos-
c application of tissue adhesives.

VASOACTIVE INTESTINAL PEPTIDE, THE MAJOR MEDIATOR OF THE WDHA (PANCREATIC CHOLERA)
ROME: VALUE OF MEASUREMENT IN DIAGNOSIS AND
TMENT. (Eng.) Bloom, S. R. (Hammersmith Hosp.,
on, England). *Am. J. Dig. Dis.* 23(4):373-376;
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value of measuring vasoactive intestinal pep-
(VIP) in the diagnosis and treatment of severe
ry diarrhea (pancreatic cholera) syndrome is
ewed. In addition, plasma VIP concentrations
1 healthy subjects, 39 patients with severe
ry diarrhea caused by a VIP-containing tumor,
atients with severe diarrhea and no tumor, and
ther patients are presented. Direct evidence
VIP is the cause of the Verner-Morrison syn-
e and that the presence of an elevated plasma
level in a patient with severe diarrhea strongly
ests the possibility of a tumor was tested in
past in pigs. In this experiment, six of eight
receiving a 10-hr VIP infusion developed se-
watery diarrhea, which stopped after the in-
on was discontinued. One of the major prob-
of research in the area of VIP investigation
been the difficulty of accurate VIP measurement.
d must be collected with the addition of a
eolytic enzyme inhibitor (Aprotinin, 1,000 kal-
ein-inhibiting U/ml blood) and the RBC
dly removed by centrifugation. The plasma
ld be deep frozen within 15 min of venipuncture
stored at -20 C. All samples must be lyophi-
d until their moisture content is below 0.1%
then sealed in vacuum. Normal human plasma
concentrations are below 20 pM. In the patients
ied, it was found that values above about 60
ere indicative of a VIP-producing tumor. The
r in seven patients was outside the pancreas.
concentrations in patients with diarrhea sec-
ry to purgative addiction, thyroid carcinoma,
carcinoma, rectal villus adenoma, and the
inoid syndrome were normal. VIP measurement
seful in monitoring tumor activity during
tment with streptozotocin or steroids.

COMPARISON OF SUCROSE AND GLUCOSE IN THE ORAL ELECTROLYTE THERAPY OF CHOLERA AND
R DIARRHEAS. (Eng.) Palmer, D. L.; Koster, F.
Islam, A. F. M. R.; Rahman, A. S. M. M.; Sack,
. (Veterans Admin. Hosp., Albuquerque, NM 87108).
ngl. J. Med. 297(20):1107-1110; 1977.

effectiveness of sucrose and glucose electro-
solutions as fluid replacement in cholera and
r forms of severe diarrhea was studied in 122
ents, all of whom were over 5 yr of age. The
ents all had a diarrheal volume greater than
/kg/hr during the initial interval of 4 to 6
i.v. fluid rehydration. Sixty-nine patients
received a sucrose electrolyte solution (40
and 53 received a glucose electrolyte solu-
(20 g/1). The sole criterion of the success or failure of p.o. fluid therapy was the ability to maintain adequate hydration without return to i.v. fluids. The total success rate was 86% for the sucrose electrolyte solution and 87% for the glucose electrolyte solution. When the study was restricted to patients with cholera, the outcome with the p.o. fluids was also similar (68% success with sucrose, 78% with glucose). Most failures (13/17) occurred in patients with stool rates over 200 ml/kg/hr during the first 24 hr. Total volumes of each p.o. fluid needed per successful treatment course were essentially identical, averaging 6.0 ± 0.5 1 for sucrose and 5.7 ± 0.7 1 for glucose. In 10 of the 17 failures (7 sucrose and 3 glucose), the same p.o. solution was started again at a later period after i.v. rehydration. There were only two failures this time, one with each solution. The results indicate that sucrose can effectively replace glucose in a p.o. electrolyte solution for severe diarrhea in patients over 5 yr of age.

7914 ALUMINIUM HYDROXIDE IN BILE-SALT DIARRHOEA.
(Eng.) Sali, A.; Murray, W. R.; MacKay, C. (Western Infirmary, Glasgow G11 6NT, Scotland). *Lancet* 2(8047):1051-1053; 1977.

The bile acid-binding property of antacids was investigated in nine patients, and the response of bile salt diarrhea to treatment with aluminum hydroxide was assessed in eight patients with severe choleraic diarrhea. In the first study, the nine peptic ulcer patients received either aluminum hydroxide (15 ml, q.i.d.) or magnesium hydroxide (10 ml, q.i.d.) p.o. for 6 days, and feces were collected over the last 2 days of treatment. The patients were then switched from one antacid to the other, and the fecal collections were repeated. Eleven age-matched controls without gastrointestinal disease received no drug. Fecal bile salt concentrations were significantly higher in patients taking aluminum hydroxide than in controls ($p<0.005$), but concentrations in patients receiving magnesium hydroxide were not significantly different from control values. In the second study, 2-day fecal collections were taken from the eight patients with diarrhea (due to ileal resection for ileal Crohn's disease or to truncal vagotomy and pyloroplasty for chronic duodenal ulceration) before and during treatment with aluminum hydroxide (40-120 ml/day), and the bile salt levels were compared with those in age- and sex-matched controls without gastrointestinal disease. Daily fecal total bile salt output in the patients before treatment was higher than that of the controls ($p<0.0005$). Bile salt output was not significantly affected by treatment with aluminum hydroxide, but analysis of total fecal bile salts does not discriminate between free and bound salts. The mean daily fecal weight decreased from 485 g to 167 g ($p<0.01$) during treatment, and five patients passed formed bowel movements. The frequency of bowel motions during treatment also fell from seven to two per day ($p<0.0005$). No patient has hypophosphatemia after 4 or more months of treatment.

7915 PARACENTESIS AND LAVAGE FOR DIAGNOSIS OF INTESTINAL GANGRENE IN NEONATAL NECROTIZING ENTEROCOLITIS.

(Eng.) Kosloske, A. M.; Lilly, J. R. (Univ. New Mexico Sch. Medicine, 2211 Lomas Blvd., N.E., Albuquerque, NM 87131). *J. Pediatr. Surg.* 13(3):315-320; 1978.

Peritoneal fluid as an index of intestinal gangrene in infants with necrotizing enterocolitis (NEC) was evaluated. Twenty samples of peritoneal fluid were obtained by paracentesis or lavage from 15 infants with nonperforated NEC. A brown color in the peritoneal fluid was noted in all eight patients found to have intestinal gangrene at subsequent operation. Gram stain showed bacteria in six of these patients, and bacterial cultures were confirmatory in all but one. In 12 samples of peritoneal fluid in patients without intestinal gangrene, the fluid was straw-colored or pink, and Gram stain showed no bacteria. The decision to operate on an infant with intestinal gangrene and impending perforation may be aided by analysis of the peritoneal fluid.

7916 OUTBREAK OF NECROTISING ENTEROCOLITIS CAUSED BY Clostridium butyricum.

(Eng.) Howard, F. M.; Bradley, J. M.; Flynn, D. M.; Noone, P.; Szawatkowski, M. (Royal Free Hosp., London NW3 2QG, England). *Lancet* 2(8048): 1099-1102; 1977.

Findings in a cluster of 12 cases of necrotizing enterocolitis that occurred over a 6-week period among 132 babies born in one hospital are presented. In three cases, enterocolitis was severe, requiring surgery. All babies had one or more artificial feeds. Three were breast fed, but all had artificial milk supplements. Seven patients were full-term babies without predisposing conditions, while the premature babies were well at the time of onset of enterocolitis. Only one infant had an Apgar score of less than 5 at birth, none was hypothermic, and only one had respiratory distress (mild). One baby had severe congenital heart disease, and in another, the ductus reopened following surgery for intestinal perforation. None had exchange transfusion; two had umbilical catheters inserted, while four had no nasogastric tubes. Gas-liquid chromatography indicated the presence of *Clostridium butyricum* in blood cultures from 9 of 10 infants tested, and the organism was grown in culture from 7 of these. Acute-phase stool samples from six babies with enterocolitis gave a gas-liquid chromatography pattern compatible with the presence of *C. butyricum*, whereas appropriate controls were negative. In view of previous reports of other *Clostridium* species as pathogenic agents, it is reasonable to suppose that another member of this genus, *C. butyricum*, invaded the gut wall and produced the illness in these cases.

7917 ACRODERMATITIS ENTEROPATHICA IN CHILDHOOD.

(Ger.) Dick, W.; Gladtke, E. (Universitats-Kinderklinik, Josef-Stelzmann-Str. 9, 5000 Koln 41, W. Germany). *Klin. Paediatr.* 189(6):401-403; 1977.

Typical acrodermatitis enteropathica was diagnos in a 5-month-old girl. Oxyquinoline treatment, initiated at the age of 8 months, brought about rapid disappearance of the symptoms, but the ski efflorescences recurred unfailingly whenever the medication was suspended. Impaired vision due t oxyquinoline-induced damage of the optic nerve w seen at the age of 6 yr, which prompted predniso treatment and a prolongation of the intervals between the oxyquinoline treatments. The reduced serum zinc level was normalized by p.o. administ zinc. The cessation of the zinc substitution ca the symptoms to recur. The patient is neurologi ly normal under zinc substitution therapy.

7918 ACETYLCHOLINESTERASE-ACTIVITY IN RECTA MUCOSA OF CHILDREN WITH OBSTIPATION.

(Eng.) Toorman, J.; Bots, G. T. A. M.; Vio, P. A. (Univ. Hosp., Leiden, Netherlands). *Virchows Arch.* [*Pathol. Anat.*] 376(2):159-164; 1977.

Rectal suction biopsy specimens from 46 patients with obstipation were studied histochemically fo acetylcholinesterase activity to determine wheth this measurement could be used in the differenti diagnosis of Hirschsprung's disease. In four ca abundant and coarse acetylcholinesterase-positiv nerve fibers were present in the lamina propria. The diagnosis of Hirschsprung's disease was supported by the clinical course in these patients only. Thirty-two patients with no acetylcholinesterase-positive nerve fibers had clinical features that did not support the diagnosis of Hirs sprung's disease (i.e., ganglion cells present, onset of obstipation after age 1 yr, or spontaneous recovery), as did 10 patients with local ag gregations of fine acetylcholinesterase-positive nerve fibers in the lamina propria. The determination of acetylcholinesterase activity is an easy and safe procedure for the diagnosis of Hirschsprung's disease.

7919 THE EFFECTIVENESS OF ANTIBIOTIC TREATM FOR Salmonella ENTERITIS AND Salmonell EXCRETORS.

(Ger.) Kindler, U.; Schoppe, W. D.; Briese, W. (1. Medizinische Klinik A der Univers tat, Moorenstr. 5, 4000 Dusseldorf, W. Germany). *Dtsch. Med. Wochenschr.* 102(47):1720-1723; 1977.

The effect of single antibiotics (tetracycline, chloramphenicol, ampicillin, penicillin, cotrimo azol) and their combinations (given in the usual dosages) on the duration of *Salmonella* excretion was studied in 122 patients with *Salmonella* enteritis and in 79 asymptomatic *Salmonella* excretors. The average duration of *Salmonella* excretion was 20.4 days in the 97 antibiotic-treated patients with *Salmonella* enteritis versus 15 day in 15 control patients who received symptomatic treatment only. The *Salmonella* excretion ceased in 45/50 asymptomatic excretors treated with anti biotics and in 26/29 untreated control excretors during the first week. The findings indicate th antibiotic treatment does not shorten considerab the duration of *Salmonella* excretion. Therefore, the antibiotic treatment of *Salmonella* infection

ther than typhoid and paratyphoid) should be
mited to systemic forms, while patients with
mplication-free *Salmonella* enteritis as well as
cretors should be treated by purgation.

20 CLINICAL RECOVERY OWING TO TARGET PARI-
ETAL CELL FAILURE IN A PATIENT WITH ZOL-
NGER-ELLISON SYNDROME. (Eng.) Wiersinga, W. M.;
tgat, G. N. (Univ. Hosp., Wilhelmina Gasthuis,
sterdam, Netherlands). *Gastroenterology* 73
):1413-1416; 1977.

e case of a patient with the Zollinger-Ellison
ndrome, in whom spontaneous disappearance of
stric hypersecretion and peptic ulcer disease oc-
rred subsequent to an intercurrent illness caus-
g acute nonspecific inflammation of the gastric
cosal lining, is presented. The patient, a 29-
-old man, had a 3-yr history of recurrent peptic
cer, occasional vomiting, and diarrhea. Upper
strointestinal series and gastroduodenoscopy
monstrated no active ulcer formation or deform-
ies in the duodenal bulb, and gastric biopsies
re normal. The fasting plasma gastrin values
re all elevated. There was no increase in plas-
gastrin after a protein-rich test meal, but the
v. injection of secretin and of ionized calcium
sulted in a dramatic increase of plasma gastrin
th a peak of 2,325 ng/l and 2,330 ng/l, resp.
fore investigations to localize a pancreatic
mor could be undertaken, the patient became
utely ill with general and severe malaise, nausea
d vomiting, and fever. He received only cloraze-
te for nervousness during this time. He gradu-
ly recovered in about 1 week, during which time
stools were produced, which was followed by
full resolution of his previous symptoms. Prior
the intercurrent illness, his basal gastric
id secretion rate was 23.52 mmol/hr, and maximal
id output after pentagastrin stimulation was
.42 mmol/hr. After the illness, the basal
cretion dropped to 0, and the maximal acid
tput was reduced to 1.20 and 0.67 mol/hr,
sp. His basal gastrin level remained high,
did the secretin-stimulated gastrin level.
wever, the meal-stimulated gastrin release
s reduced after the illness. Three months
ter the illness, the gastric mucosa showed severe
flammation with lymphocytes, plasma cells, and
lymorphonuclear leukocytes throughout the gas-
ic mucosa with inflammatory permeation and de-
ruction of the glandular layer. Eight months
ter the illness, evidence of gastritis was still
esent, but the severity of the inflammation was
minished. The dramatic clinical improvement
ter subsiding of the intercurrent illness was
viously linked to pronounced failure of the pari-
al cell mass for acid secretion and not to in-
ction of the gastrinoma, because gastrin hyper-
retion was unchanged.

21 MAGNESIUM SUPPLEMENTATION IN PROTEIN-
CALORIE MALNUTRITION. (Eng.) Nichols,
L.; Alvarado, J.; Hazlewood, C. F.; Viteri, F.
ylor Coll. Medicine, Houston, TX). *Am. J. Clin.*
r. 31(1):176-188; 1978.

7922 SERUM RIBONUCLEASE ACTIVITY IN PATIENTS DURING PARENTERAL NUTRITION, CHRONIC HEMODIALYSIS AND ACUTE PANCREATITIS. (Eng.) Sommer, H.; Gang, V.; Heidland, A. (Medizinische Universitatsklinik, Josef-Schneider-Str. 2, D-8700 Wurzburg, W. Germany). *Klin. Wochenschr.* 55:1019-1020; 1977.

7923 SMALL SPHERICAL VIRUSES IN FAECES FROM GASTROENTERITIS PATIENTS. (Eng.) Kjeldsberg, E. (Natl. Inst. Public Health, Postuttak, Oslo 1, Norway). *Acta Pathol. Microbiol. Scand.* [*B*] 85(5):351-354; 1977.

7924 CARCINOMA OF THE MAJOR AND MINOR SALIVARY GLANDS: ANALYSIS OF TREATMENT RESULTS AND SITES AND CAUSES OF FAILURES. (Eng.) Fu, K. K.; Leibel, S. A.; Levine, M. L.; Friedlander, L. M.; Boles, R.; Phillips, T. L. (Univ. California, Div. Radiation Oncology, 330 Moffitt, San Francisco, CA 94143). *Cancer* 40(6):2882-2890; 1977.

7925 INTESTINAL DAMAGE IN ROTAVIRUS AND ADENOVIRUS GASTROENTERITIS ASSESSED BY D-XYLOSE MALABSORPTION. (Eng.) Mavromichalis, J.; Evans, N.; McNeish, A. S.; Bryden, A. S.; Davies, H. A.; Flewett, T. H. (Univ. Thessaloniki, Thessaloniki, Greece). *Arch. Dis. Child.* 52(7):589-591; 1977.

7926 MALIGNANT MYOEPITHELIOMA OF THE PAROTID GLAND. (Eng.) Crissman, J. D.; Wirman, J. A.; Harris, A. (Coll. Medicine, Univ. Cincinnati, 231 Bethesda, Cincinnati, OH 45267). *Cancer* 40(6):3042-3049; 1977.

7927 SUPERIOR VENA CAVA SYNDROME SECONDARY TO Candida THROMBOPHLEBITIS COMPLICATING PARENTERAL ALIMENTATION. (Eng.) Wiley, E. L.; Hutchins, G. M. (Johns Hopkins Hosp., Baltimore, MD 21205). *J. Pediatr.* 91(6):977-979; 1977.

7928 INTESTINAL PROTEIN LOSS IN PROTEIN-CALORIC MALNUTRITION. (Eng.) Crespo, R.; Schmidt, B. J.; Carvalho, N.; Costa, C. D. (Faculdade de Medicina de Sorocaba, PUC, Sao Paulo, Brazil). *Arq. Gastroenterol.* 14(3):167-174; 1977.

7929 PERITONEAL DRAINAGE UNDER LOCAL ANESTHESIA FOR PERFORATIONS FROM NECROTIZING ENTEROCOLITIS. (Eng.) Ein, S. H.; Marshall, D. G.; Girvan, D. (Hosp. Sick Children, Toronto, Ontario, Canada). *J. Pediatr. Surg.* 12(6):963-967; 1977.

7930 ZOLLINGER-ELLISON SYNDROME CAUSED BY A DUODENAL WALL TUMOUR. (Eng.) Kune, G. A.; Judson, R.; Sinclair, R. (Repatriation General Hosp., Heidelberg, Victoria 3077, Australia). *Med. J. Aust.* 2(11):359-361; 1977.

GENERAL

7931 DYNAMIC FLOW STUDY IN WARTHIN'S TUMOR OF PAROTID GLAND. (Eng.) Sagar, V. V.; Piccone, J. M.; Meckelnburg, R. L. (Veterans Admin. Hosp., 1601 Kirkwood Highway, Wilmington, DE 19805). *Clin. Nucl. Med.* 2(11):404-405; 1977.

7932 SUBMANDIBULAR GLAND TUMORS. (Eng.) Hanna, D. C.; Clairmont, A. A. (Western Pennsylvania Hosp., Pittsburgh, PA). *Plast. Reconstr. Surg.* 61(2):198-203; 1978.

7933 RELATION OF HUMAN GASTROINTESTINAL MUCUS TO DISEASE STATES. (Eng.) Schrager, J.; Oates, M. D. G. (Royal Infirmary, Wigan, Lancashire, England). *Br. Med. Bull.* 34(1):79-82; 1978.

7934 GASTROINTESTINAL CANCER: EPIDEMIOLOGY AND EXPERIMENTAL STUDIES. (Eng.) Jansson, B.; Jacobs, M. M.; Griffin, A. C. (M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77030). *Adv. Exp. Med. Biol.* 91:305-322; 1977.

7935 DRUG-INDUCED GASTROINTESTINAL DISEASE. (Eng.) Hyson, E. A.; Burrell, M.; Toffler, R. (Yale Univ. Sch. Medicine, New Haven, CT). *Gastrointest. Radiol.* 2(3):183-212; 1977.

7936 RESPONSES OF THE SPLANCHNIC CIRCULATION TO ISCHAEMIA. (Eng.) Marston, A. (Middlesex Hosp., London, England). *J. Clin. Pat* 30(11, Suppl.):59-67; 1977.

7937 ELECTROLYTE ECONOMY AND ITS HORMONAL REGULATION IN CONGENITAL CHLORIDE DIARRHEA. (Eng.) Holmberg, C. (Children's Hosp., Univ. Helsinki, SF-00290 Helsinki 29, Finland). *Pediatr. Res.* 12(2):82-86; 1978.

7938 AGE DISTRIBUTION OF ANTIBODY TO REOVIRU LIKE AGENT IN CHILDREN IN TAIWAN. (Eng Echeverria, P.; Blacklow, N. R.; Ho, M. T.; Cukor G.; Beasley, R. P. (U.S. Naval Medical Res. Unit No. 2, Box 14, APO San Francisco, CA 96263). *J. Pediatr.* 91(6):960-962; 1977.

See also, 7272, 7303, 7369, 7450, 7465, 7468, 749
7495, 7595, 7603, 7608, 7613, 7618, 762
7634, 7639, 7641, 7643, 7668, 7671, 767
7721, 7727, 7740, 7749, 7750, 7798, 785
7853, 7858, 7882, 7896.

GENERAL

Parasitology

7939 *Strongyloides stercoralis* COLITIS: FINDINGS IN FOUR CASES. (Eng.) Drasin, G. F.; Moss, J. P.; Cheng, S. H. (Jewish Hosp., 217 Chestnut St., Louisville, KY 40202). *Radiology* 126(3):619-621; 1978.

The case of a patient with extensive biopsy-proved *Strongyloides stercoralis* colitis is presented, and the radiological findings in this patient and in three others are discussed. The patient was a 61-yr-old man who presented with wheezing and coughing, followed 1 yr later by diarrhea. The first barium enema examination was normal, but another examination carried out after he developed bloody stools showed severe ulcerating colitis with both small and large ulcers, from the cecum to the rectum. Nodularity and a loss of the haustral pattern were noted. Small bowel examination demonstrated typical changes, with fluid, submucosal edema, absence of a mucosal pattern, and slow transit time. Stool specimens for ova and parasites contained larvae of *S. stercoralis*. Ova were present within the submucosa and lamina propria. All three of the other cases were found to have loss of haustration, but ulceration was present in only two. Narrowing was present in the mid-descending colon and distal transverse colon, and stenosis or spasm occurred in the righ colon of another patient. *S. stercoralis* infection was not detected until postmortem examinatio in one patient. Barium enema examinations can help in evaluating the nature and clinical progre of this disease.

7940 BISAMIDINES OF 2,6-DIAMINOANTHRAQUINONE ANTIAMEBIC AGENTS. (Eng.) Fabio, P. F Fields, T. L.; Lin, Y-i.; Burden, E. J.; Carvajal S.; Murdock, K. C.; Lang, S. A., Jr. (Lederle Lab American Cyanamid Co., Pearl River, NY 10965). *J Med. Chem.* 21(3):273-276; 1978.

7941 ANAEROBIC LIVER ABSCESS AND INTRAHEPATI METASTASES: A CASE REPORT AND REVIEW O THE LITERATURE. (Eng.) Trump, D. L.; Fahnestock R.; Cloutier, C. T.; Dickman, M. D. (Johns Hopkin Hosp., 601 N. Broadway, Baltimore, MD 21205). *Cancer* 41(2):682-686; 1978.

7942 HEPATIC SCHISTOSOMIASIS: A CASE WITH INTRAHEPATIC SHUNTING AND EXTRAHEPATIC PORTAL VEIN OCCLUSION. (Eng.) Sniderman, K. W.; Sos, T. A. (New York Hosp.-Cornell Medical Center, 525 E. 68th St., New York, NY 10021). *Am. J. Roentgenol.* 130(3):565-567; 1978.

7943 ENDOSCOPIC RETROGRADE CHOLANGIOGRAPHY IN HEPATIC HYDATID DISEASE. (Eng.) Cottone, M.; Amuso, M.; Cotton, P. B. (Ospedale V. Cervello, Palermo, Sicily, Italy). *Br. J. Surg.* 65(2):107-108; 1978.

7944 ON ALLOWING FOR DIAGNOSTIC IMPERFECTIONS IN ASSESSING EFFECTIVENESS OF TREATMENT FOR SCHISTOSOMIASIS. (Eng.) Goddard, M. J. (London Sch. Hygiene and Tropical Medicine, London WC1, England). *Int. J. Epidemiol.* 6(4):381-389; 1977.

7945 PILOT STUDY WITH TINIDAZOLE SINGLE DOSE IN THE TREATMENT OF GIARDIASIS. (Eng.) Sampaio Silva, M. L.; Coutinho da Costa, F. M.; Peixoto, M. M.; Bastos, M. A.; Queiros, M. J.; Calheiros, J. M. (Instituto Nacional de Saude [INSA], Oporto, Portugal). *Acta Ther.* 3(4):303-308; 1977.

7946 TREATMENT OF GIARDIASIS IN PAEDIATRICS WITH A SINGLE DOSE OF TINIDAZOLE. (Eng.) Coutinho da Costa, F. M.; Sampaio Silva, M. L.; Peixoto, M. M.; Bastos, M. A. (Inspeccao de Saude, Coimbra, Portugal). *Acta Ther.* 3(4):309-312; 1977.

7947 CHEMOTHERAPY OF HUMAN INTESTINAL PARASITIC DISEASES. (Eng.) Botero R., D. (Sch. Medicine, Univ. Antioquia, Medellin, Colombia). *Ann. Rev. Pharm. Toxicol.* 18:1-15; 1978.

7948 HEPATIC AND RENAL AMYLOIDOSIS IN ASSOCIATION WITH SCHISTOSOMIASIS: A CASE REPORT. (Eng.) Gold, C. H. (Beilinson Medical Center, Petah Tiqva, Israel). *S. Afr. Med. J.* 53(17):681-682; 1978.

7949 RESOLUTION OF AMOEBIC LIVER ABSCESS STUDIED BY SERIAL LIVER SCANNING. (Eng.) Habibullah, C. M.; Quraishi, M. A.; Rao, S. R.; Chandra, V.; Murthy, K. J. R. (Osmania Medical Coll., Hyderabad, India). *J. Indian Med. Assoc.* 69(11):250-252; 1977.

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See also, 7275, 7396, 7455, 7459, 7460, 7461, 7462, 7464, 7503, 7736, 7805.

Regional Enteritis

7961 ANGIOGRAPHY OF COLONIC CROHN'S DISEASE: THE ZONING SIGN REVISITED. (Eng.) Herlinger, H. (St. James' Univ. Hosp., Leeds, England). *Gastrointest. Radiol.* 2(4):397-400; 1978.

The zoning sign in distinguishing colonic Crohn's disease from ulcerative colitis is described, and the presence or absence of this sign was studied in 40 angiograms. This sign was demonstrated in 50% of the 40 angiograms carried out in patients with colonic Crohn's disease, including six of nine cases of cecal Crohn's disease. When positive, the colon shows a double layer of vascularity, an intensely vascularized inner core (zone A) likely to represent the mucosa/submucosa and an outer cylinder of decreased vascularity (zone B). In 4 of the 40 angiograms, a thin, somewhat interrupted outer layer of vascularity was identified. This was clearly separated from zone A by the seemingly avascular zone B. It can be assumed that this outermost layer represents that of subserosal hyperemia, and it is proposed to refer to it as zone C.

7962 CARCINOEMBRYONIC ANTIGEN (CEA) SERUM LEVELS IN PATIENTS WITH CROHN'S DISEASE IN REGARD TO LOCALIZATION, DURATION AND ACTIVITY OF THE DISEASE. (Ger.) Kruis, W.; Pfaff, G.; Lamerz, R.; Eisenburg, J. (Klinikum Grosshadern der Univ. Munchen, Marchioninistrasse 15, 8 Munich 70, W. Germany). *Fortschr. Med.* 95(47/48):2795-2798; 1977.

The serum levels of carcinoembryonic antigen (CEA) were measured repeatedly in 24 patients with Crohn's disease over a period of up to 35 months. Elevated CEA levels (>3 ng/ml; average, 4.5 ng/ml; maximum, 9 ng/ml) were found in 13 patients. The length of the disease was ≤5 yr in six patients and >5 yr in seven. Both the Crohn's Disease Activity Index (CDAI) and the CEA level were very high in 4 tests, and both parameters were simultaneously low in 10. The incidences of increased CEA levels were 1/3 in patients with Crohn's disease of the ileum, 2/5 patients with Crohn's disease of the colon, and 10/16 patients with Crohn's disease of the ileum and colon. Recurrences were accompanied by increased CEA level in four tests, no increase was seen during recurrence in two tests, and elevation of the CEA level without recurrence was seen in nine tests. The findings show a positive correlation between the extent of the lesion and the CEA serum level but no correlation between the duration of the disease and the CEA level. Good correlation was seen in a few cases between CDAI and the CEA level. It is concluded that the serum CEA level has no diagnostic or prognostic value in Crohn's disease.

7963 LEUCOCYTE ASCORBIC ACID IN CROHN'S DISEASE. (Eng.) Hughes, R. G.; Williams, N. (Bristol Royal Infirmary, Bristol BS2 8HW, England). *Digestion* 17(3):272-274; 1978.

The effects of surgery, diet, and drugs on ascorbic acid status were investigated in 19 patients with Crohn's disease, as spontaneous fistula formation and poor wound healing in this disease may be related to inadequate vitamin C and poor collagen metabolism. The mean leukocyte ascorbic acid (LAA) level in the patients (160.7 ± 19.75 nmol/10^8 WBC) was significantly lower than that in normal age- and sex-matched controls (232.7 ± 40.2 nmol/10^8 WBC, $p<0.01$). There was a positive correlation between dietary ascorbic acid intake and LAA levels ($r=0.302$). No significant difference in LAA levels between those patients who had undergone surgery and those who had not was found. When drug history was reviewed, LAA levels did not differ significantly from the rest of the group. The low LAA levels in patients with Crohn's disease appear to be due to the disease rather than to the effect of drug or operative treatment. Prescribing supplementary ascorbic acid is an appropriate step in correcting this deficiency.

7964 HODGKIN'S DISEASE COMPLICATING CROHN'S COLITIS. (Eng.) Codling, B. W.; Keighley, M. R. B.; Slaney, G. (Queen Elizabeth Hosp., Birmingham, England). *Surgery* 82(5):625-628; 1977.

A case of Hodgkin's disease involving an area of Crohn's colitis in a 35-yr-old patient with a 20-yr history of inflammatory bowel disease is described. The patient presented with weight loss, abdominal pain, bloody diarrhea, and night sweats. The mucosa of the terminal ileum and colon showed extensive fissuring, a cobblestone pattern, and transmural thickening. The terminal 18 cm of resected colon was diffusely infiltrated by a firm, white tumor tissue. The attached lymph nodes were enlarged with a uniform, pale, cut surface. Parrafin sections of the resected tissue showed prominent lymphoid tissue with a diffuse increase in eosinophils and fibrous tissue. The mucosa of the small intestine also showed large numbers of Paneth cells and lymphocytes, but there was no evidence of small intestinal involvement by Crohn's disease or Hodgkin's lymphoma. The proximal colon showed features typical of Crohn's disease, but there was no evidence of tumor involvement. The wall of the distal colon showed extensive mucosal ulceration, an acute and chronic inflammatory cell reaction, and diffuse tumor infiltration (histiocytes, plasma cells, lymphocytes, a few eosinophils), and the lymph nodes attached to the specimen showed replacement by Hodgkin's tissue similar to that in the main tumor mass. The diagnosis was Hodgkin's disease of the mixed cellularity type After radiotherapy, quadruple chemotherapy, and an additional laparotomy for an abdominal abscess, the patient has gained weight, has no evidence of tumor recurrence, and is well despite hepatic in-

lvement from the original tumor. The simultan-
us occurrence of these two entities may be co-
cidental, or there may be a true association be-
een Crohn's disease and lymphoma. If so, it is
kely that altered immune mechanisms play a role
the pathogenesis of the condition.

65 A FAMILIAL PATTERN IN INFLAMMATORY DISEASE
OF THE BOWEL (CROHN'S DISEASE AND ULCERA-
VE COLITIS). (Eng.) Dassel, P. M. (Ferguson-
oste-Ferguson Hosp., 72 Sheldon Blvd. S.E., Grand
pids, MI 49502). *Dis. Colon Rectum* 20(8):669-671;
77.

elve families in which two or more members had in-
ammatory bowel disease are reported. The families
re of Caucasian, non-Jewish descent. The greatest
cidence of inflammatory bowel disease occurred in
milies 1 and 2, in which three sisters and a male
usin in a family of 10, and two brothers, one son,
d two daughters in a family of 13, resp., were af-
cted by Crohn's disease. Another family was unus-
l in that the husband and wife had Crohn's disease
d ulcerative colitis, resp., and one of two child-
n had ulcerative colitis. There were a total of
cases of Crohn's disease and 7 of ulcerative coli-
s. The most common association in familial bowel
seases was in siblings, and then in parent-child
lationships.

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GLYCATE) IN THE TREATMENT OF CROHN'S DIS-
E. (Pol.) Szmigiel, Z.; Pikor-Daraz, I.; Szc-
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J. Gastroenterol. 68(5):494-497; 1977.

58 THE FEATURES OF GRANULOMATOUS COLITIS IN
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ngot, J.; Goncette, L.; Van Heuverzwyn, R.;
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See also, 7495, 7625, 7722, 7723, 7724, 7728, 7733, 7735.

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GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tra Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

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The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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LANGUAGE ABBREVIATIONS

Afrikaans	Afr.	Georgian	Geo.	Persian	Per.
Albanian	Alb.	German	Ger.	Polish	Pol.
Arabic	Ara.	Greek	Gre.	Portuguese	Por.
Armenian	Arm.	Hausa	Hau.	Pushto	Pus.
Azerbaijani	Aze.	Hebrew	Heb.	Rumanian	Rum.
Belorussian	Bel.	Hindi	Hin.	Russian	Rus.
Bengali	Ben.	Hungarian	Hun.	Serbian	Ser.
Bulgarian	Bul.	Icelandic	Ice.	Slovak	Slo.
Burmese	Bur.	Indonesian	Ind.	Slovene	Slv.
Chinese	Chi.	Interlingua	Int.	Spanish	Spa.
Croatian	Cro.	Italian	Ita.	Swahili	Swa.
Czechoslovakian	Cze.	Japanese	Jpn.	Swedish	Swe.
Danish	Dan.	Kirghiz	Kir.	Tagalog	Tag.
Dutch	Dut.	Korean	Kor.	Tamil	Tam.
English	Eng.	Latin	Lat.	Telugu	Tel.
Esperanto	Esp.	Latvian	Lav.	Thai	Tha.
Estonian	Est.	Lithuanian	Lit.	Turkish	Tur.
Finnish	Fin.	Marathi	Mar.	Ukranian	Ukr.
Flemish	Fle.	Masai	Mas.	Urdu	Urd.
French	Fre.	Multilingual	Mlt.	Vietnamese	Vie.
Gaelic	Gae.	Norwegian	Nor.	Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	ml, μl	milli-, microliter(s)
ADP	adenosine diphosphate	mm	millimeter(s)
AMP	adenosine monophosphate	mOsm	milliosmolar; milliosmeter(s)
amp	ampere	msec	millisecond(s)
ATP	adenosine triphosphate	mV	millivolt(s)
A	angstrom	min	minute(s)
BSP	sulfobromophthalein	MTD	maximum tolerated dose
C	degrees centigrade	NAD	nicotinamide adenine dinucleotide
cal	calories	NADH	reduced nicotinamide adenine dinucleotide
cc	cubic centimeter	NADP	nicotinamide adenine dinucleotidephosphate
cm	centimeter(s)	NADPH	reduced nicotinamide adenine dinucleotidephosphate
dl	deciliter	ng	nanogram (10^{-9})
DNA	deoxyribonucleic acid	nm	nanometer(s)
ED_{50}	median effective dose(s)	Pa	ambient pressure
EDTA	ethylenediamine tetraacetic acid	PAS	periodic acid - Schiff
e.g.	for example	pg	picogram (10^{-12})
EEG	electroencephalogram	pgEq	picogram equivalent(s)
ESR	erythrocyte sedimentation rate	p.o.	orally
g	gram(s)	ppb	parts per billion
μg	microgram(s)	ppm	parts per million
Hz	Hertz	r	Roentgen
hr	hour(s)	RBC	red blood cells (erythrocytes), red blood count
Ig	immunoglobulin(s)	resp.	respectively
i.m.	intramuscular	RNA	ribonucleic acid
i.p.	intraperitoneal	s.c.	subcutaneous
IU	international unit(s)	sec	second(s)
i.v.	intravenous	SGOT	serum glutamic-oxalacetic transaminase
kcal	kilocalorie(s)	SGPT	serum glutamic-pyruvic transaminase
kg	kilogram(s)	U	unit(s)
K_m	Michaelis constant	UV	ultraviolet
LD_{50}	median lethal dose(s)	V	volt
LDH	lactic acid dehydrogenase	WBC	white blood cells (leukocytes), white blood count
m	meter(s)	yr	year(s)
M	molar; mole(s)		
mM	millimolar; millimole(s)		
μM	micromolar; micromole(s)		
ma	milliampere(s)		
mCi, μCi	milli-, microcurie(s)		
mEq	milliequivalent(s)		
mg	milligram(s)		

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

7974 DISTRIBUTION OF GASTRIN CELLS IN THE GASTRIC MUCOSA: AN IMMUNOFLUORESCENCE STUDY. (Jpn.) Nagata, T. (Second Dept. Pathology, Kyushu Univ., Fukuoka 812, Japan). *Fukuoka Acta Med.* 68(7):313-326; 1977.

The morphology and distribution of gastrin cells in gastric mucosal surgical specimens from 27 patients with carcinoma, 13 with gastric ulcer, 19 with duodenal ulcer, and 4 with other lesions were examined, using an indirect immunofluorescence method. Synthetic human 1-17 gastrin antiserum was used. Gastrin cells were found almost exclusively in the mucous membrane of the pyloric antrum, and their distribution was patchy. They were most numerous in the foveolae at the level of the middle third of the mucosal layer. Smaller numbers of cells were observed in the pyloric glands, the foveolae of the fundic mucosa, and the Brunner's glands of the duodenal bulb. No gastrin cells were found in the fundic glands, the cardiac glands, or in intestinalized gastric mucosal epithelium. Gastrin cells were frequently oval in shape, and the immunofluorescence was entirely cytoplasmic and yellow-green in color with unstained nuclei. The cytoplasm was clear when stained with hematoxylin and eosin. The cells were argyrophilic but not argentaffin. The number of gastrin cells decreased with increasing age of the patient and with increased intestinal metaplasia and gastric mucosal atrophy. In cases without intestinal metaplasia, the number of gastrin cells in the gastric mucosa within 7 cm from the pyloric ring ranged from 200/cm to 250/cm; the number decreased gradually as the distance from the pyloric ring increased. There was no apparent relationship between the number of gastrin cells and gastric secretion.

7975 EVIDENCE OF INNERVATION OF THE SMALL INTESTINE FROM THE CERVICAL SYMPATHETIC GANGLIA. (Eng.) Ahlman, B. H.; Lundberg, J. M.; Dahlstrom, A.; Larsson, I.; Pettersson, G.; Kewenter, J.; *et al.* (Dept. Surgery III, Univ. Goteborg, Goteborg, Sweden). *J. Surg. Res.* 24(3):142-149; 1978.

To study further the possible nervous pathways from the sympathetic neck ganglia via the vagal nerves to the intestine of the cat, intraoperative nerve-crush procedures were combined with the fluorescence method of Hillarp-Falck to visualize monoamine-containing nerve fibers and with the horseradish peroxidase (HRP) technique to demonstrate neuronal pathways by retrograde mapping. Two normal cats and two in which the superior cervical ganglia (SCG) bilaterally had been surgically removed were subjected to crushing of the right vagal nerve at the cervical and subdiaphragmatic levels 30-45 min before this vagal tissue was dissected for examination by fluorescence microscopy. Four other cats were injected at several hundred 0.5-cm intervals around the circumference of the gut wall with HRP (0.5-1.0 g/animal). Unilateral (right) crush of the cervical vagus and the cervical sympathetic chain was performed immediately (cat I), 24 hr after the injections (cats II and III), or not at all (cat IV); the tissues were dissected for examination at 24, 60, 72 hr, or 5 days, resp., in cats I-IV. In the two normal cats with intact SCG, many fibers with accumulated fluorescent material were seen cranial to the crush at the cervical level, due to a proximodistal, intra-axonal transport of amine storage granules accumulating proximal to the crush site. At the subdiaphragmatic level, the vagal nerve contained a large number of fluorescent fibers cranial to the crush. Removal of the SCG caused a complete disappearance of the fluorescent fibers at the cervical level, but many fluorescent fibers still remained at the subdiaphragmatic level. In all the cats, the celiac mesenteric inferior ganglion contained many HRP-positive cells. No other region in cat I was HRP-positive. In cats II and III, a few HRP-positive cells were seen in the left nodose ganglion, left SCG, and left and right stellate ganglia. In cat IV, all examined ganglia contained (on both sides) either a few HRP-positive cells (in the thoracic, nodose, and superior cervical ganglia) or a moderate number of HRP-positive cells (in the stellate ganglia). The fluorescence studies demonstrate that in the cat the cervical vagus carries catecholamine (CA)-containing fibers, emanating from the SCG. The persistence of CA fibers at the subdiaphragmatic level demonstrates that the vagus nerve receives more CA fibers caudal to the cervical level, probably from the stellate, and possibly from the intrathoracic sympathetic ganglia. The results clearly demonstrate that not only the stellate ganglia but also the SCG via the vagus nerve send CA fibers that innervate part of the small intestine, strongly modifying the classical hypothesis that these ganglia innervate mainly the head, neck, and heart.

7976 TOPOGRAPHIC STUDY OF THE SMALL INTESTINAL EPITHELIAL CELL SURFACE AND ADAPTIVE CHANGES INDUCED BY PROXIMAL RESECTION [Abstract]. (Eng.) Freeman, H.; Garrido, A.; Kim, Y.; Etzler, M. (Veterans Admin Hosp., San Francisco, CA). *Gastroenterology* 72(5, Part 2):1059; 1977.

7977 ULTRASTRUCTURE OF THE GUT NEUROTENSIN CELL [Abstract]. (Eng.) Alumets, J.; Sundler, F.; Hakanson, R. (Dept. Histology, Univ. Lund, Lund, Sweden). *Acta Endocrinol. (Kbh.)* 85 (Suppl. 212):104; 1977.

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

7978 THE RIGHT BRANCHES OF THE SUPERIOR MESENTERIC ARTERY FOR THE VASCULARIZATION OF THE LARGE BOWEL [Abstract]. (Eng.) Ilic, A.; Blagotic, M.; Marinkovic, S. (Medical Faculty, Belgrade, Yugoslavia). *Acta Anat. (Basel)* 99(1): 96-97; 1977.

7979 INNOMINATE LINES OF THE COLON. RADIOLOGICAL-HISTOLOGICAL CORRELATION. (Eng.) Matsuura, K.; Nakata, H.; Takeda, N.; Nakata, S.; Shimoda, Y. (Kyushu Univ., Sch. Medicine, Maidashi, Higashi-Ku, Fukuoka-Shi, Japan). *Radiology* 123(3): 581-584; 1977.

7980 THE MORPHOLOGY OF THE FIBROUS TISSUE OF SUBMUCOSA OF THE LARGE INTESTINE AND THE EFFECT OF VARIOUS SUTURE MATERIALS [Abstract]. (Eng.) Lord, M. G.; Broughton, A. C.; Williams, H. T. G. (Manchester Royal Infirmary, Oxford Rd., Manchester 13, England). *Eur. Surg. Res.* 9(Suppl. 1): 161; 1977.

7981 MORPHOLOGIC ALTERATIONS IN RATS WITH CHRONIC ENDOGENOUS HYPERGASTRINEMIA [Abstract]. (Eng.) Owen, R. L.; Deveney, K.; Way, L. W. (Veterans Admin. Hosp., San Francisco, CA). *Clin. Res.* 26(2):112A; 1978.

7982 ADENYLATE CYCLASE IS THE BEST MARKER OF THE PLASMA MEMBRANE OF HUMAN HEPATOCYTE [Abstract]. (Eng.) Duvaldestin, P.; Pecker, F.; Hanoune, J.; Berthelot, P. (Unite de Recherches INSERM U-99, Hopital Henri Mondor, Creteil, France *Digestion* 16(4):337-338; 1977.

7983 ESOPHAGEAL LENGTHS IN CHILDREN: CORRELATION WITH AGE, SURFACE AREA AND HEIGHT [Abstract]. (Eng.) Strobel, C. T.; Byrne, W. J.; Euler, A. R.; Ament, M. E. (Dept. Pediatrics, Univ California, Los Angeles, CA). *Clin. Res.* 26(2): 174A; 1978.

7984 QUANTITATION OF INTESTINAL MUCOSAL SURFA AREA BY STEREOLOGY [Abstract]. (Eng.) Heneghan, J. P.; Heneghan, J. B. (Louisiana State Univ. Sch. Medicine, New Orleans, LA 70112). *Phys logist* 20(4):42; 1977.

See also, 8019, 8020, 8073, 8121, 8125, 8126, 812
8138, 8198, 8327, 8353, 8518, 8567.

ABSORPTION - EXCRETION - TRANSPORT

7985 THE BILE DUCT LIGATED ANIMAL: A MODEL FOR DETERMINING TOTAL INTESTINAL ABSORPTION. (Eng.) Halladay, S. C.; Enderlin, F. E.; Parkinson, T. M.; Honohan, T. (Biological Sciences, Dynapol, 1454 Page Mill Rd., Palo Alto, CA 94034). *Drug Chem. Toxicol.* 1(2):203-218; 1978.

A new bile duct-ligated animal model for determining total intestinal absorption was evaluated using compounds with markedly different metabolism and excretion characteristics. The test solutions were administered p.o. by gavage in control and bile duct-ligated female Sprague-Dawley rats or ICR/Sim mice. A comparison of the serum concentration time curves for digoxin, bumetanide, imipramine, hexobarbital, and sodium benzoate in ligated and control rats indicated that bile duct ligation had no significant effect on absorption *per se* during the study period. In ligated rats, total absorption of imipramine (which undergoes enterohepatic circulation), as estimated from urine and tissue recoveries, was 92%. A significant overestimation of total absorption (128%) resulted from combining urine and tissue recoveries from controls with bile recoveries from cannulated rats. For sodium benzoate, which undergoes little or no enterohepatic circulation, there was no significant difference in total recoveries determined by these two methods (97% versus 101%). In ligated mice, absorption o imipramine and sodium benzoate was 80% and 89%, resp. This model simply and accurately estimates intestinal absorption of both types of compounds, and eliminates the error inherent in determining absorption of compounds that are excreted in the bile when urine, feces, and tissue data from one animal are combined with bile data from another. The bile duct-ligated animal model is applicable especially to small animals such as mice, in whic bile duct cannulation is extremely difficult, and to the study of compounds whose properties do not permit traditional methods to be used.

7986 EFFECT OF MODIFIED SHAM FEEDING ON JEJU TRANSPORT AND PANCREATIC AND BILIARY SECRETION IN MAN. (Eng.) Read, N. W.; Cooper, K.; Fordtran, J. S. (Univ. Texas Health Science Center, Dallas, TX 75235). *Am. J. Physiol.* 234 (4):E417-E420; 1978.

The effect of modified sham feeding (thoroughly masticating but not swallowing an appetizing meal on the intestinal transport of water and electrolytes was studied using jejunal perfusion via a triple-lumen tube to investigate whether intes-inal secretion is under parasympathetic control. en volunteers who had experienced intestinal perfusion previously and of whom three had pentagastrin-fast achlorhydria (controls for acid effect) were used in the 4-hr experiment (the 1st, rd, and 4th hr were control periods, the 2nd hr as the experimental sham feeding). Gastric perfusion was continuous; the infusion site was the uodenojejunal flexure, and the collecting site as the gastric antrum; measurements were performed o assure that no gastric acid entered the test egment. Sham feeding produced a significant ise ($p<0.01$) in gastric acid output in the seven ormal subjects compared with the achlorhydric ontrols. Movement of water and electrolytes cross the jejunal wall and the jejunal potential ifference made no significant response to sham eeding. There was no consistent change in the utput of amylase, protein, or bile acids in response to sham feeding in the normal or achlorydric subjects. The results suggest that cephlic stimulation of the vagus by itself does not nfluence jejunal transport, but the vagus may act n concert with other factors as a regulator of jeunal transport. The results also suggest that luctuation in bile acid secretion is not an imporant regulator of ion transport in the jejunum, at east in the basal state.

987 INTESTINAL ABSORPTION OF ASCORBIC ACID AND ITS PASSAGE THROUGH THE LIPOID MEMRANE OF GUINEA PIGS.

(Eng.) Odumosu, A.; Wilson, . W. M. (Dept. Pharmacology, Trinity Coll., ublin 2, Ireland). *Int. J. Vitam. Nutr. Res.* 48 1):3-11; 1978.

he intestinal absorption of ascorbic acid (AA) and ts passage through the lipoid membrane was studied n normal (N), hypervitaminoic (HV), and scorbutic S) guinea pigs. Measurements were made in ligated egments of the intestinal lumen of intact living ats. The animals received either a scorbutogenic iet alone (group S) or this diet plus 20 mg vitain C/day (in group N) or 100 mg vitamin C/day (in roup HV) for 27 days prior to the absorption study. lasma and WBC concentrations of AA were measured efore and after AA (20 mg in 1 ml) or saline (1 l) had been introduced into the intestinal loops here the solutions were then maintained for 2 hr. fter introduction of AA, small and insignificant levations in the WBC AA concentrations occurred n each group, and the plasma levels of AA rose rom 0.60 ± 0.3 to 0.96 ± 0.07 mg/ml ($p<0.02$) in he N group and from 1.14 ± 0.18 to 1.57 ± 0.17 g/ml ($p<0.05$) in the HV group, but only from 0.11 0.01 to 0.13 ± 0.09 mg/ml in the S group. When he retention of AA in the intestinal loops was easured following saline and AA treatments for 2 r, the largest amount of AA remained in the loops f the S group (8.38 mg/ml) compared with the N roup (2.9 mg/ml) and the HV group (3.85 mg/ml), he S group value being significantly different rom the other two ($p<0.02$). Mucosal cell uptake f AA was least in the HV group (3.68 mg/g weight), reater in the N group (7.12 mg/g), and greatest n the S group (10.13 mg/g), all differences being significant ($p<0.01$ or $p<0.05$). The muscle content of AA was highest in the S group after the introduction of AA (1.94 mg/g weight) compared with the N and the HV groups (1.75 mg/g in both). Preferential intestinal cell absorption of AA in the S guinea pigs was demonstrated: the AA uptake from the intestinal lumen and retention in the mucosal cells was greatest in this group, but impaired transfer of AA to the plasma also occurred. The S mucosal cells showed histological signs of damage, which may account for this negligible transfer of AA from the intestine into plasma. The high AA concentration in S mucosal cells may be due to a passive diffusion mechanism resulting from the relatively high concentration of AA in the intestinal lumen. It is possible that in acute scurvy, only passive transfer of AA occurs, while active transfer into the plasma is suppressed.

7988 ROLE OF SULFHYDRYL GROUPS IN ACID TRANSPORT BY STOMACH.

(Eng.) Fromm, D.; Fuhro, R. (Harvard Medical Sch., Boston, MA). *Surg. Forum* 28:351-353; 1977.

The effects of two sulfhydryl-reactive agents, *p*-chloromercuribenzene sulfonic acid (PCMBS) and dithiothreitol (DTT), on acid secretion and backward diffusion by isolated rabbit gastric mucosa were studied. The spontaneous acid secretory rate of fundic mucosa (2.0 ± 0.2 μEq/hr cm^2) was constant over 90 min. Addition of sulfhydryl-oxidizing PCMBS (0.5 mM) to the mucosal side significantly decreased the basal rate of acid secretion to 0.2 ± 0.1 μEq/hr/cm^2 ($p<0.001$), but its addition to the serosal side was without effect. Addition of sulfhydryl-reducing DTT (4 mM) to the mucosal side significantly stimulated acid secretion to 2.7 ± 0.3 μEq/hr/cm^2 ($p<0.001$) in both the absence and presence of PCMBS whose inhibitory effect DTT was able to prevent and reverse. Addition of 4 mM cysteine (another sulfhydryl-reducing agent) to the mucosal side did not stimulate acid secretion but did completely prevent inhibition by PCMBS. The presence of PCMBS increased the rate of luminal acid loss by the fundic mucosa (from 0.3 ± 0.1 to 1.3 ± 0.2 μEq/hr/cm^2, $p<0.001$) and decreased the rate of luminal acid loss by antral mucosa (from 1.0 ± 0.2 to 0.4 ± 0.1 μEq/hr/cm^2, $p<0.001$). DTT alone did not change luminal acid loss by the antrum; it reversed the PCMBS effect on luminal acid loss by the fundus. The mean difference between the mucosal and serosal rates of CO$_2$ appearance approximated the rate of acid secretion both before and after PCMBS exposure (2.8 ± 0.5 and 0.2 ± 0.1 μM/hr/cm^2, resp.) but responded to DTT by increasing significantly (from 2.2 ± 0.6 to 3.3 ± 0.6 μM/hr/cm^2, $p<0.025$), indicating that both agents primarily affect mineral rather than organic acid secretion. Both mucosal and serosal addition of PCMBS caused a 52-85% decrease in shortcircuit current ($p<0.001$) and a 15-35% increase in tissue electrical resistance of the fundus ($p<0.001$). DTT alone did not affect these parameters but did reverse the effects of PCMBS on them. It is concluded that the sulfhydryl sites associated with acid secretion are located on the luminal side of the mucosa, that they are separate from the sites associated with active transport of sodium and chloride, that the increase in backward diffusion caused by PCMBS is due to inhibition of acid secretion, and that the stimulatory effect of DTT alone is not due to the prevention of spontaneous oxidation of sulfhydryl groups.

7989 D-XYLOSE ABSORPTION TEST: PHARMACOKINETIC AND STATISTICAL STUDY.

(Fre.) Huguenin, P.; Cochet, B.; Balant, L.; Loizeau, E. (Hopital Cantonal, CH-1211 Geneve 4, Switzerland). *Schweiz. Med. Wochenschr.* 108(6):206-214; 1978.

D-xylose pharmacokinetics were studied in six healthy subjects by serial measurement of blood and urinary D-xylose levels following p.o. or i.v. administration of D-xylose. Four tests were used in these subjects: A--23 g D-xylose in 1,000 ml 0.45% NaCl, i.v., over 60 min; B--4.6 g D-xylose in 1,000 ml 0.45% NaCl, i.v., over 60 min; C--25 g D-xylose in 500 ml H_2O, p.o., over 5 min; and D--5 g D-xylose in 500 ml H_2O, p.o., over 5 min. NaCl (0.9%, 500 ml) was perfused over 60 min during tests C and D. A different order of the tests was used for each subject; there was a 1-week or 1-month interval between tests. In addition, 13 patients with obesity, renal, or hepatic insufficiency or a T-tube after cholecystectomy were also investigated. Following i.v. administration of D-xylose, there were individual variations in both the rate and completeness of D-xylose absorption, so that the time and value of peak D-xylose blood level were highly variable. The urinary elimination was about 50% of the administered dose and was nearly complete by 8 hr. After p.o. administration, the D-xylose blood levels rose rapidly over a roughly 2-hr period (there were significant increases, $p<0.01$ or $p<0.05$, in level during this early period) and then decreased semilogarithmically over the next 6 hr. The urinary elimination was about 30% for the 25-g dose and about 40% of the 5-g dose at 8 hr. Renal insufficiency increased the apparent elimination half-life of D-xylose and markedly reduced renal D-xylose excretion. The results indicate that there is a very wide range of blood and urinary levels obtained by the D-xylose tolerance test. Urinary D-xylose excretion alone is not a reliable index of intestinal absorption.

7990 INTESTINAL APOPROTEINS DURING FAT ABSORPTION.

(Eng.) Schonfeld, G.; Bell, E.; Alpers, D. H. (Washington Univ. Sch. Medicine, St. Louis, MO 63110). *J. Clin. Invest.* 61(6):1539-1550; 1978.

Apolipoprotein (Apo) A-I, ApoB, and ApoE (or arginine-rich apoprotein, ARP) were localized in rat intestinal mucosa by an indirect immunofluorescence method to compare their roles in the intracellular production of intestinal chylomicrons (and/or very low density lipoproteins, VLDL). In addition, tissue levels of ApoA-I and ApoB were measured by radioimmunoassay during fat absorption. Antisera were produced using ApoA-I isolated from rat plasma high-density lipoprotein, and ApoB and ARP from plasma VLDL by column chromatography. The apoproteins yielded single bands on polyacrylamide disc gel electrophoresis in urea and in sodium dodecyl sulfate. Anti-apoprotein antisera produced in rabbits appeared to be monospecific on double-antibody immunoprecipitation of ^{125}I-label apoproteins. In fasted animals, granular stainir of ApoA-I was noted in the Golgi regions of epithelial cells in the top third of the villus. At 30 min, when fat droplets were seen in the supran clear cytoplasm of the cells along the top two-thirds of the villus, intense ApoA-I staining surrounded the cytoplasmic droplets. Later, whe epithelial cells and lamina propria both contain fat droplets, bright ApoA-I stain surrounded many droplets in the supranuclear cytoplasm and in th lamina propria. Over the same period, ApoA-I ti sue levels rose 10-fold. The distribution and time-course of ApoB staining was nearly identica with that of ApoA-I. Concomitantly, tissue ApoB levels doubled. In contrast, in fasting rat intestine, ARP staining was sparse, punctate, and confined to the lower quarter of the villus. Af fat feeding, stained droplets were seen only in the lamina propria near the base of the villus, even though abundant ARP occurred in cells along most of this length of the villus. Stain never surrounded droplets inside cells. Thus, ApoA-I and ApoB appear to participate in the intracellu assembly of gut lipoproteins, whereas ARP does n although ARP was found within the mucosal cells. The liver stained heavily for ARP and lightly fo ApoA-I, whereas intestine stained heavily for Ap and lightly for ARP. Both organs stained for Ap These findings suggest that there may be some qu titative "specialization" of the two organs that secrete lipoproteins.

7991 ENTERAL ABSORPTION OF HIGH CALCIUM DOS AS DETERMINED BY MEANS OF STABLE ISOTO

(Ger.) Behne, D.; Bratter, P.; Herzfeld, U.; Kr D. (Bereich Kernchemie und Reaktor, Hahn-Meitne Institut fur Kernforschung Berlin, Glienicker St 100, D-1000 Berlin 39, W. Germany). *Klin. Woche schr.* 56(2):69-74; 1978.

The enteral resorption of high p.o. Ca doses (5 and 1,000 mg; calcium-Sandoz forte and calcium-Sandoz fortissimum, resp.) was determined in ei healthy subjects by use of a double-isotope met The isotopes were assayed by neutron activation analysis. The stable ^{48}Ca isotope was used to label the p.o. Ca dose. The rapidly exchangeab body Ca pool was measured by the i.v. administra tion of $CaCl_2$ enriched with the stable ^{46}Ca isotope immediately after p.o. administration of t p.o. Ca doses. The 24-hr Ca exchange, determin from the serum ^{46}Ca level, was found to be 6.4 1 g or 98.8 ± 15.4 mg/kg of body weight. For t p.o. administered Ca, the elimination constant was 0.980 for the 500-mg Ca dose, and 0.880 mg for the 1,000-mg dose. The invasion constant w 0.056 and 0.073, resp., for the two doses while the elimination half-life was 185 min for eithe dose. The resorption rate was 30.5% for 500 mg and 28% for 1,000 mg, i.e., the resorption rate was independent of the dose administered. The serum Ca level showed a short-term rise following the oral administration of 1,000 mg Ca. The findings indicate that the quantity of resorbed Ca is directly proportional to the p.o. dose at high doses and that high p.o. Ca doses can be used therapeutically in degenerative bone diseases.

7992 THE GASTROINTESTINAL ABSORPTION OF LIPOSOMALLY ENTRAPPED INSULIN IN NORMAL RATS [Abstract]. (Eng.) Patel, H. M.; Ryman, B. E. (Charing Cross Hosp. Medical Sch., Fulham Palace Rd., London W6 8RF, England). *Biochem. Soc. Trans.* 5(4):1054-1055; 1977.

7993 INTESTINAL ABSORPTION OF BOTULINUM TOXINS OF DIFFERENT MOLECULAR SIZES IN RATS. (Eng.) Sugii, S.; Ohishi, I.; Sakaguchi, G. (Coll. Agriculture, Univ. Osaka Prefecture, Sakai-shi, Osaka 591, Japan). *Infect. Immun.* 17(3):491-496; 1977.

7994 MECHANISMS INVOLVED IN TRANSCAPILLARY FLUID MOVEMENT INTO THE SECRETING CAT SUBMANDIBULAR GLAND [Abstract]. (Eng.) Lundvall, J.; Holmberg, J. (Dept. Physiology, Univ. Lund, Lund, Sweden). *Acta Physiol. Scand.* 102(1):16A; 1978.

7995 ABSORPTION OF PANCREATIC LIPASE BY THE DUODENUM INTO LYMPH VESSELS [Abstract]. (Eng.) Papp, M.; Feher, S.; Folly, G.; Horvath, E. J. (Inst. Experimental Medicine, Hungarian Acad. Sciences, H-1450 Budapest, Hungary). *Ir. J. Med. Sci.* 146(Suppl. 1):23-24; 1977.

7996 PLACENTAL TRANSFER OF BILE PIGMENTS IN RATS [Abstract]. (Eng.) Palma, L.; McDonagh, A. F. (Liver Center, Univ. California, San Francisco, CA 94143). *Gastroenterology* 73(5): 1237; 1977.

7997 EFFECT OF BILIARY LIPIDS ON THE ADSORPTION OF PANCREATIC LIPASE AND COLIPASE AT INTERFACES [Abstract]. (Eng.) Lairon, D.; Leonardi, J.; Nalbone, G.; Lafont, H.; Domingo, N.; Hauton, J. C.; Verger, (INSERM U-130, Group de Recherches sur le Transport des Lipides, 46 Bd. de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146 (Suppl. 1):11; 1977.

7998 EFFECT OF LUMINAL HYPEROSMOLALITY ON H^+ LOSS IN DUODENUM [Abstract]. (Eng.) Johnson, G. M.; Chung, R. K. (Veterans Admin. Hosp., Iowa City, IA 52240). *Fed. Proc.* 37(3):698; 1978.

7999 JEJUNAL ABSORPTION OF GLUCOSE IN RATS CHRONICALLY INFECTED WITH Trypanosoma cruzi. (Eng.) Salgado, J. A.; de P. Castro, L.; Ribeiro, T. C.; Pessoa, W.; de Oliveira, J. P. M.; Bambirra, E. A.; *et al.* (Faculdade de Medicina, Universidade Federal de Minas Gerais, Caixa Gerais, Caixa Postal, 340, 30000 Belo Horizonte, MG., Brazil). *Arq. Gastroenterol.* 14(4):210-214; 1977.

8000 MODIFICATION OF TRANSPORT PROCESSES ACROSS RAT INTESTINE [Abstract]. (Eng.) Hardcastle, J.; Hardcastle, P. T.; Sandford, P. A. (Dept. Physiology, Univ. Sheffield, Sheffield, England). *Br. J. Pharmacol.* 62(3):463P; 1978.

8001 TRANSPORT CHARACTERISTICS OF ISOLATED NEWBORN RABBIT ILEUM. (Eng.) Cooke, H. J.; Dawson, D. C. (Kansas Univ. Medical Center, Kansas City, KS 66103). *Am. J. Physiol.* 234(3): E257-E260; 1978.

8002 INTESTINAL TRANSPORT OF SALT AND WATER. (Eng.) Turnberg, L. A. (Hope Hosp., Eccles Old Rd., Salford M6 8HD, Lancashire, England). *Clin. Sci. Mol. Med.* 54(5):337-348; 1978.

8003 LANTHANUM AS A TOOL TO STUDY THE ROLE OF PHOSPHATIDYLINOSITOL IN THE CALCIUM TRANSPORT IN RAT PAROTID GLANDS UPON CHOLINERGIC STIMULATION. (Eng.) Keryer, G.; Rossignol, B. (Institut de Biochimie, Universite de Paris-Sud, Batiment 432, F-91405 Orsay-Cedex, France). *Eur. J. Biochem.* 85(1):77-83; 1978.

8004 CHANGES IN ABSORPTION OF GLUCOSE AND PROLINE FOLLOWING IRRADIATION TO THE EXTERIORIZED ILEUM. (Eng.) Mohiuddin, M.; Tamura, K.; DeMare, P. (Thomas Jefferson Univ. Hosp., Philadelphia, PA 19107). *Radiat. Res.* 74(1): 186-190; 1978.

See also, 8022, 8130, 8135, 8156, 8210, 8309, 8312, 8315, 8570.

MOTILITY

8005 THE EFFECTS OF PARAOESOPHAGEAL STRUCTURES AND VAGOTOMY ON THE CANINE LOWER OESOPHAGEAL SPHINCTER FUNCTION. (Eng.) Laitinen, S. (Univ. Central Hosp., SF-90220 Oulu 22, Finland). *Ann. Chir. Gynaecol.* 66(6):304-310; 1977.

The effects of extrinsic paraesophageal structures and of the vagus nerve on lower esophageal function were investigated in dogs. Manometry demonstrated a high-pressure zone at the gastroesophageal junction of all 25 dogs examined. In all dogs in which the gastroesophageal junction was isolated from surrounding structures by a stiff-walled Silastic tube, the mean resting lower esophageal sphincter pressure (LESP) decreased from a preoperative level of 14.0 ± 3.0 mm Hg to 13.0 ± 2.7 mm Hg. Transabdominal subdiaphragmatic vagotomy, transthoracic subhilar vagotomy, or cervical vagotomy did not significantly change the mean resting LES pressure, but the response to abdominal compression was significantly decreased ($p<0.01$) by all three procedures. The vagus nerves apparently have no major role in the maintenance of resting LESP. The LES response to increased intra-abdominal pressure seems to represent a genuine increase in LES tone, to which extrinsic mechanical factors add only a small contribution. This response seems to be mediated by a vagal reflex arc, the afferent part of which has its origin below the diaphragm.

8006 RELATION OF GASTROESOPHAGEAL SPHINCTER PRESSURE AND ESOPHAGEAL CONTRACTILE WAVES TO AGE IN MAN.

(Eng.) Csendes, A.; Guiraldes, E.; Bancalari, A.; Braghetto, I.; Ayala, M. (Hospital J. J. Aguirre, Santos Dumont 999, Santiago, Chile). *Scand. J. Gastroenterol.* 13(4):443-447; 1978.

To determine a normal range of values for gastroesophageal sphincter pressure (GESP) and peristaltic wave amplitude (PWA) and variations in these levels among subjects of different age groups, esophageal motility was studied in 113 normal subjects ranging in age from 2 months to 74 yr. The GESP levels were significantly higher in children aged 2-5 months (37.2 ± 3.8 mm Hg) than in all age groups over 1 yr of age ($p<0.001$). With increasing age, the resting GESP gradually fell to a mean of slightly over 12 mm Hg in age groups between 15 and 24 yr and between 55 and 64 yr. There was a further drop in subjects aged 65 to 74 yr. Children in the 6- to 12-month age group also had significantly higher ($p<0.01$) pressures than did all adult groups and children in the 6- to 14-yr age group, but not from children in the 1- to 5-yr age group. In the adult population, the lowest GESP recorded was 7 mm Hg and the highest 20 mm Hg. Sphincter length increased with age from 1.1 cm in the 2- to 5-month age group up to 2.4 cm in the 15- to 24-yr group. There was no further change thereafter. The PWA was similar in all age groups except those 65 yr or older; in the latter group, the percentage of peristaltic waves induced by deglutition was 75%, while that in all other groups ranged between 82% and 100%.

8007 THE ROLE OF LOCAL CHOLINERGIC PATHWAYS IN THE MOTOR RESPONSE TO CHOLECYSTOKININ AND GASTRIN IN ISOLATED GUINEA-PIG FUNDUS AND ANTRUM.

(Eng.) Gerner, T.; Haffner, J. F. W. (Ulleval Hosp., Oslo 1, Norway). *Scand. J. Gastroenterol.* 12(6):751-757; 1977.

Studies were carried out to determine to what extent the local cholinergic pathways participate in the motor response to cholecystokinin-pancreozymin (CCK-PZ) and gastrin in guinea pig fundus and antrum *in vitro*. The motor responses to acetylcholine and the ganglion-stimulating agent, dimethylphenylpiperazinium (DMPP), were studied for comparison. CCK-PZ (0.38 U/ml), gastrin (0.05 μg/ml), and acetylcholine (10^{-3} M) increased antral rhythmic activity and fundal basal pressure ($p<0.05$). DMPP (10^{-5} M) also generally increased antral rhythmic activity, but it invariably induced a drop in fundic pressure. The antral motor effects were significantly ($p<0.05$) blocked by 10^{-5} M atropine or 10^{-6} M tetrodotoxin. However, the fundal motor responses were almost completely unaffected. It is concluded that CCK-PZ and gastrin exert their antral motor effects essentially through local cholinergic neural pathways, while the motor responses in the fundus are almost entirely independent of these pathways.

8008 EFFECTS OF CERULEIN ON INTESTINAL MOTIL

(Jpn.) Nakamura, N.; Shiozaki, S.; Kojima, T.; Shimizu, M.; Tanaka, M. (Pharmaceutical Res. Lab., Kyowa Hakko Kogyo Co., Ltd., Shimotogari, Nagaizumicho, Shizuoka 411, Japan). *Folia Pharmacol. Jpn.* 73(7):743-756; 1977.

The effects of cerulein on intestinal motility were compared with those of neostigmine, pantethine, prostaglandin E_1 (PGE_1), and prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$). Cerulein stimulated electric discharges in the intestinal tracts of anesthetized rabbits and was more potent than either neostigmine or pantethine. The small intestine was more sensitive to this agent than was the large intestine. PGE_1 inhibited, while $PGF_{2\alpha}$ stimulated ele trical discharges in the small intestine. Atropi did not completely inhibit the stimulatory effect of cerulein. Cerulein promoted the transit of a charcoal meal through the intestine of the mouse and was approximately 30 times more potent than neostigmine. At high doses, the promotion was reduced, and, the reduction was inhibited by reserpine or phentolamine-propranolol. These observations indicate that cerulein produces a catecholamine release at high doses. Cerulein increased intestinal transit time in cecectomized mice at doses 30 times higher than given to intact mice. Cerulein, neostigmine, PGE_1, and PGF_2 produced an excitatory effect on the isolated rabbit intestine. The minimal effective concentration of these four substances were 3×10^{-10} to 1 10^{-8}, 10^{-9}, and 3×10^{-11} g/ml in the ileum and 3 10^{-9} to 10^{-8}, 10^{-8} to 3×10^{-8}, 10^{-10}, and 10^{-11} g/ml in the proximal colon, resp.

8009 FACTORS INFLUENCING TONE IN RABBIT LARG INTESTINE.

(Eng.) McKirdy, H. C. (Val of Leven District General Hosp., Alexandria, Dunbartonshire, Scotland). *Q. J. Exp. Physiol.* 63(2 111-118; 1978.

8010 ROLE OF GASTRIC EMPTYING ON ETHANOL POISONING IN RATS. (Eng.) Hillbom, M. E.; Wallgren, H. (Res. Lab., State Alcohol Monopoly, Box 350, SF-00101 Helsinki 10, Finland). *Med. Biol.* 56(1):37-41; 1978.

8011 A SIMPLE DEVICE MEASURING DIFFERENCES IN LEVEL IN THE OESOPHAGUS. (Eng.) Ask, P.; Tibbling, L. (Univ. Hosp., S-581 85 Linkoping, Sweden). *Acta Otolaryngol.* 85(3/4):296-297; 1978.

8012 SIMULTANEOUS RECORDING OF GASTRIC AND DUODENAL ELECTRICAL ACTIVITY. (Eng.) Civalero, L. A.; Kantelius, M.; Nilsson, B. Y. (Sodersjukhuset, S-100 64 Stockholm, Sweden). *Scand. J. Gastroenterol.* 13(4):459-463; 1978.

8013 THE EFFECT OF PAPAVERINE ON THE CONTRACTION OF THE HUMAN GALLBLADDER. (Eng.) Katevuo, K.; Kanto, J.; Manell, D.; Mantyla, R. (Dept. Radiology, Turku Univ., Turku, Finland). *Int. J. Clin. Pharmacol. Biopharmacol.* 16(5):220-222; 1978.

8014 NEURAL CONTROL OF PRIMARY ESOPHAGEAL PERISTALSIS [Letter to Editor]. (Eng.) Janssens, J.; Vantrappen, G.; Hellemans, J.; Diamant, N. E.; El-Sharkawy, T. Y. (Dept. Medical Res., Univ. Leuven, Leuven, Belgium). *Gastroenterology* 74(4):801-803; 1978.

8015 THE ADRENERGIC INNERVATION OF THE SUBMANDIBULAR GLAND OF THE CAT AND THE EFFECTS OF VARIOUS SURGICAL DENERVATIONS ON THESE NERVES: A HISTOCHEMICAL AND ULTRASTRUCTURAL STUDY INCLUDING THE USE OF 5-HYDROXYDOPAMINE. (Eng.) Garrett, J. R.; Kemplay, S. K. (King's Coll. Hosp. Dental Sch., London SE5 8RX, England). *J. Anat.* 124(1):99-115; 1977.

See also, 8016, 8017, 8053, 8114, 8123, 8185, 8262, 8270, 8274, 8275.

SECRETION AND METABOLISM

8016 SECRETORY, MOTOR AND VASCULAR EFFECTS IN THE SUBLINGUAL GLAND OF THE RAT CAUSED BY AUTONOMIC NERVE STIMULATION. (Eng.) Templeton, D.; Thulin, A. (Inst. Physiology, Univ. Lund, Lund, Sweden). *Q. J. Exp. Physiol.* 63(1):59-66; 1978.

8017 THE ENDOCRINE CONTROL OF GASTROINTESTINAL FUNCTION. (Eng.) Chey, W. Y.; Gutierrez, J. G. (Genesee Hosp., Rochester, NY). *Adv. Intern. Med.* 23:61-84; 1978.

8018 DEVELOPMENT OF SECRETORY FUNCTION IN RAT PAROTID GLAND. (Eng.) Grand, R. J.; Schay, M. I. (Children's Hosp. Medical Center, 300 Longwood Ave., Boston, MA 02115). *Pediatr. Res.* 12(2):100-104; 1978.

8019 CELLULAR LOCALISATION OF HUMAN UROGASTRONE/EPIDERMAL GROWTH FACTOR. (Eng.) Elder, J. B.; Williams, G.; Lacey, E.; Gregory, H. (Dept. Surgery, Univ. Manchester, Manchester, England). *Nature* 271(5644):466-467; 1978.

See also, 7981, 7994, 8003, 8130.

SECRETION AND METABOLISM

Stomach

8020 ULTRASTRUCTURAL CHANGES IN OXYNTIC CELLS ASSOCIATED WITH SECRETORY FUNCTION: A MEMBRANE-RECYCLING HYPOTHESIS. (Eng.) Forte, T. M.; Machen, T. E.; Forte, J. G. (Donner Lab., Univ. California, Berkeley, CA 94720). *Gastroenterology* 73(4, Part 2):941-955; 1977.

Changes in piglet oxyntic cells associated with secretory function were studied ultrastructurally after the induction of secretion by histamine and after removal of the secretagogue. Morphological changes consisting chiefly of proliferation of the secretory surface were detected in the piglet oxyntic cell as early as 3 min after the addition of 10^{-5} M histamine to the preparation and before the production of detectable amounts of HCl secretion. However, there were frank changes in electrophysiology indicative of secretion: mucosal resistance and potential difference decreased. Microfilaments in the resting state and in the early phases of the onset of HCl secretion formed a ring of parallel filaments just beneath the microvillar plasma membrane; during maximal secretion, there appeared to be some detachment of microfilaments, which then appeared condensed in the center of the elongated microvillar processes. During the early stages of secretagogue withdrawal, when microvilli were condensed, the microfilaments showed great disorganization. With reestablishment of the resting state, the microfilaments were again aligned parallel with the microvilli. Structural changes associated with the reestablishment of the resting state were striking. In general, the apical surface membrane was reorganized or recycled back into the cytoplasmic tubulovesicular form. Analysis of intervening structural events showed a complex series of membrane alterations, which were characterized as: (a) condensation of elongated apical microvilli within the canalicular space; (b) close apposition and association of secretory membrane surfaces; (c) massive endocytosis of surface membranes into the cytoplasm, frequently in the form of pentalaminar membrane structures; and (d) reappearance of tubulovesicle profiles within the cytoplasm. The endocytosed pentalaminar structures had a thickness (242 A) just double that of single plasma membranes (119 A), thus making it unlikely that they represent fused membranes. Still, the very close apposition and contact of these membrane surfaces suggest that critical physical changes underlie this phase of membrane uptake. Morphological events after the withdrawal of histamine suggest that there must be important controlling steps in the phase of massive membrane uptake and in the reformation of tubulovesicular structures.

8021 ADENYLATE CYCLASE OF HUMAN GASTRIC MUCOSA.

(Eng.) Simon, B.; Kather, H. (Medizinische Universitatsklinik Heidelberg, Bergheimerstrasse 58, D-6900 Heidelberg, W. Germany). *Digestion* 16(1/2):175-179; 1977.

Adenylate cyclase activity was studied in homogenates of human gastric mucosa, and the effects of histamine and catecholamines on this activity were examined. Stomach tissue was obtained by subtotal gastric resection from seven patients with peptic ulcer. The mean basal adenylate cyclase activity of the gastric mucosa averaged 0.85 ± 0.4 nmol cyclic AMP (cAMP) formed/mg protein/15 min. Saturating concentrations of histamine (5×10^{-3} M) caused an increase in enzyme activity of about fourfold. cAMP accumulation in the same preparation was enhanced approximately two- to threefold by maximally effective concentrations of epinephrine (5×10^{-4} M). The concentrations required for half maximal stimulation were 5×10^{-5} M for both activators. Isoproterenol stimulated the enzyme activity to about the same degree as did epinephrine. The stimulatory action of catecholamines and histamine were additive, indicating that these substances act on separate adenylate cyclases The histamine responsiveness of the enzyme system was almost completely abolished by 1×10^{-3} M cimetidine, and catecholamine excitation was selectively blocked by propranolol (1×10^{-5} M). The results show that human gastric mucosa contains at least two separate hormone-sensitive adenylate cyclases coupled to different receptors: one being responsive to histamine and the other to catecholamines. The demonstration of a histamine-sensitive adenylate cyclase system in human gastric mucosa is consistent with the concept that cAMP is the intracellular mediator of the secretagogue effect of histamine in man as well as in amphibia and rodents.

8022 CHLORIDE TRANSPORT AND ACID SECRETION IN STOMACH.

(Eng.) Durbin, R. P. (Cardiovascular Res. Inst., Univ. California San Francisco, San Francisco, CA 94143). *Gastroenterology* 73(4, Part 2):927-930; 1977.

Different approaches to identifying the cellular Cl^- pool to facilitate the localization of the several modes of Cl^- transport in isolated frog gastric mucosa are illustrated. Flux studies on the effects of stimulating acid secretion and of removing secretory Cl^- on movement of Cl^- from nutrient to secretory solution and on the effects of removing nutrient Cl^- on the movement of Cl^- from secretory to nutrient solution showed that only a few minutes were required for the isotopic flux to reach a steady state. Cellular Cl^- uptake was quantitated by determining the extracellular space, using ^3H-mannitol. The overall mannitol space of 54% did not differ significantly from that reported for the mannitol space in tied mucosal sacs and was fairly close to the inulin space of 47-52% quoted for mounted mucosae. Therefore, the mannitol space seems to be a reasonable estimate of the extracellular space. The large mannitol space of 47% labeled from the nutrient solution corresponded to the serosal layer of connective tissue prominent in histological sections. The total tissue Cl^- (56.1 mEq/kg) was close to the values for freshly dissected mucosae (51.6 mEq/kg) and for incubated mucosae (68.0 mEq/kg) that were previously reported by one group of investigators; smaller levels found in other studies may reflect an incomplete extraction of Cl^- from the tissue. Further studies showed that over one-half of the cell Cl^- was taken up into the mucosal cells in 2 min. This rate of Cl^- uptake was compared to acid production using the average wet weight per unit area in these experiments of 53 mg/cm^2; cell Cl^- uptake was calculated to be 4.9 μEq/cm^2/hr, a value slightly larger than the rate of acid secretion. The results suggest that much of Cl^- uptake occurs by exchange diffusion of Cl^- at the secretory surface.

8023 INTERACTIONS OF GASTRIC BLOOD FLOW, BARRIER BREAKER, AND HYDROGEN ION BACK DIFFUSION DURING ULCER FORMATION IN THE RAT.

(Eng.)

rsereau, W. A.; Hinchey, E. J. (Montreal General
sp., Montreal, Quebec H3G 1A4, Canada). *Surgery*
(3):248-251; 1978.

e interactions among gastric blood flow, H^+ back-
ffusion, and the effects of barrier breakers
re studied in a rat gastric chamber prepara-
on to clarify the respective roles of these
rameters in the pathogenesis of acute gastric
sions. Application of sodium taurocholate (STC)
the entire mucosal surface markedly increased
loss from the chamber in the normal flow study
ean, 133.1 ± 6.5 μEq/15 min), whereas reduction
the area of barrier break by 50% reduced the H^+
ss proportionally (mean 61.7 ± 7.2 μEq/15 min).
e application of STC to an area of 1 cm^2 (15%
rrier break) led to a H^+ loss of 23.2 ± 4.4 μEq/
min, which was not significantly different from
e control period. No mucosal lesions were found
ere mucosal blood flow was present. Interruption
blood flow markedly reduced the rate of H^+ back-
ffusion, as compared with normal flow groups
which either 100% or 50% of the area was
vered with STC, but there was no signifi-
nt difference with 15% barrier break whether
ood flow was interrupted or not. Complete
chemia resulted in ulceration, which was lim-
ed to the area pretreated with STC. The ap-
ication of STC to the squamous epithelium-lined
restomach failed to increase the permeability
this membrane to H^+ or Na$^+$ or to increase fluid
ux. Sodium entry into the chamber was noted
ter barrier break in the normal flow group; how-
er, the rate was not directly proportional to
e area of barrier break and was less as the area
barrier break decreased. Under conditions of
mplete ischemia, sodium influx was markedly re-
ced. It is concluded that, although H^+ back-
ffusion is a convenient measure of barrier per-
ability under conditions of normal mucosal blood
ow, during mucosal ischemia this parameter fails
reflect permeability because of decreased mu-
sal clearance of H^+. These findings would ex-
ain apparent controversy whereby ulceration oc-
rs under shock conditions in the absence of ap-
rent H^+ back-diffusion.

24 EVIDENCE FOR H_2-RECEPTOR-MEDIATED FEED-
BACK REGULATION OF HISTAMINE RELEASE FROM
DOCRINE CELLS IN THE RAT STOMACH. (Eng.) Hakan-
, R.; Larsson, L. I.; Liedberg, G.; Sundler, F.
ept. Pharmacology, Univ. Lund, Lund, Sweden). *J.
ysiol. (Lond.)* 276:151-157; 1978.

e effects of histamine H_2-receptor agonists and
the blockade of H_2-receptors on pentagastrin-
duced reduction of gastric histamine release was
udied in male Wistar or Sprague-Dawley rats. The
stric mucosal histamine level was measured after
c. injection of histamine dihydrochloride (0, 5,
, or 25 mg/kg) or infusion of histamine (50 mg/kg/
) or dimaprit (100 mg/kg/hr) with pentagastrin
jections of 1, 62.5, 125, 250, or 500 μg/kg.
ockade by the H_2-receptor antagonists, metiamide
0 mg/kg/hr or 10 mg/kg) and burimamide (20 mg/kg),
d by the H_1-receptor antagonist, mepyramine (30
mg/kg) was studied. In doses above 62.5 μg/kg, pentagastrin produced a 20-30% reduction of gastric histamine level 1 hr after injection ($p<0.001$ compared with untreated controls). Injected histamine inhibited this reduction if the histamine dose was high and the pentagastrin dose was low. Infused histamine or dimaprit prevented reduction of gastric histamine level at all dose levels of pentagastrin. When infusion of these receptor agonists was accompanied by infusion of the H_2-receptor antagonist, metiamide, the pentagastrin-induced release of histamine declined significantly ($p<0.001$) relative to saline-treated controls. The reduction of gastric mucosal histamine level after treatment with burimamide and pentagastrin was significant ($p<0.005$), as was the reduction caused by treatment with metiamide and pentagastrin ($p<0.001$) relative to rats treated with saline and pentagastrin. No significant lowering of gastric histamine content was noted when mepyramide and pentagastrin treatment was used. Similar results were obtained in intact and in antrectomized rats. To produce similar effects in vagotomized rats, higher doses of pentagastrin were required. The present study demonstrates a direct effect of the H_2-receptor antagonists on the histamine-storing endocrine-like cells in the oxyntic mucosa in the rat stomach. The effect is described as H_2-receptor mediated autofeedback, a mechanism whereby mobilized histamine inhibits further release of histamine from the cells.

8025 INHIBITION OF HISTAMINE-N-METHYLTRANSFERASE AND HISTAMINASE (DIAMINE OXIDASE) BY A NEW HISTAMINE H_2-RECEPTOR AGONIST, DIMAPRIT. (Eng.) Shaff, R. E.; Beaven, M. A. (Natl. Heart, Lung, Blood Inst., Natl. Inst. Health, Bethesda, MD 20014). *Biochem. Pharmacol.* 26(21):2075-2078; 1977.

The effects of Dimaprit on the *in vitro* activities of histamine decarboxylase (HD), diamine oxidase (DAO), and histamine-*N*-methyltransferase (HNMT) were investigated. HD was prepared from rat gastric mucosa, DAO from rat ileum, and HNMT from frozen guinea pig brain. Dimaprit was tested at 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}, and 2.5×10^{-3} M. Dimaprit had no effect on HD; it inhibited both DAO and HNMT noncompetitively, with apparent K_i values of $7\text{-}9 \times 10^{-6}$ M for HNMT and $2.5\text{-}3.0 \times 10^{-4}$ M for DAO. All values were the average of duplicate experiments. The results indicate that Dimaprit is a weak inhibitor of DAO and a stronger inhibitor of HNMT.

8026 IS HISTAMINE A MEDIATOR IN BILE-INDUCED GASTRIC MUCOSAL INJURY? (Eng.) Cheung, L. Y.; Porterfield, G. (Veterans Admin. Hosp., St. Louis, MO 63110). *J. Surg. Res.* 24(4):272-276; 1978.

The protective effect of histamine$_1$- and histamine$_2$-receptor antagonists on the mucosal permeability barrier and on gross mucosal injury was evaluated in anesthetized dogs. After i.m. injection of mepyramine (10 mg/kg) and continuous i.v. infusion of cimetidine (50 μg/kg/min), measurements of ion fluxes and the transmucosal potential difference (PD) were made, and the degree of mucosal injury was scored by an independent observer. No evidence of mucosal injury was seen in any of the dogs before the introduction of 5.0 mM Na taurocholate. Measurements continued after the taurocholate was added to the HCl bathing solution of the test mucosa. The degree of mucosal injury in antihistamine-treated dogs was not significantly different from that in untreated dogs (lesion index, 1.9 ± 0.3 versus 1.6 ± 0.5, resp.). The PD in control mucosa did not change over the course of the experiment. Antihistamine treatment did not change the PD; however, exposure of the test mucosa to taurocholate resulted in an immediate drop in PD ($p<0.01$). The net flux of H^+ was not altered by the administration of the H_1- and H_2-receptor antagonists. Following exposure of the test mucosa to taurocholate, there was a marked increase in H^+ loss ($p<0.05$) compared with control mucosa or test mucosa before the addition of taurocholate. The change in Na^+ efflux was similar to that of H^+. Exposure to taurocholate resulted in a significant ($p<0.05$) increase in sodium efflux into the lumen. Comparison of H^+ flux in antihistamine-treated dogs and in untreated controls showed that exposure to taurocholate in either group resulted in a significant increase in luminal loss of H^+ and that the rate of H^+ back-diffusion increased slightly in the treated dogs. The failure of antihistamines to prevent bile salt-induced disruption of the permeability barrier and to protect against gross mucosal injury does not support the concept that histamine is a mediator in bile salt injury.

8027 PROPERTIES OF K^+/H^+ EXCHANGE ATPase FROM DOG GASTRIC MUCOSA.

(Eng.) Scholes, P.; Lee, J. (Imperial Chemical Industries, Ltd., Mereside, Alderley Park, Macclesfield, Cheshire SK10 4TG, England). *Acta Physiol. Scand.* (Suppl.):427-434; 1978.

The suggestion that K^+ entry into vesicles prepared from dog gastric mucosa is important in maintaining optimum activity of the electrically neutral ATP hydrolysis-driven transport of H^+ into these vesicles was tested, and the hypothesis that K^+ ions act as counterions for H^+ transport was investigated. H^+ transport into microsomal vesicles from dog gastric mucosa was completely abolished by nigericin (2.5 μg/ml), which catalyzes a tightly coupled exchange of K^+ and H^+. Since this abolition could not be achieved by valinomycin (1.25 mg/ml) or FCCP (4.5×10^{-6} M) alone but only in combination, it appears that nigericin catalyzes an exchange of one H^+ ion for one K^+ ion. Optimum proton transport driven by ATP proceeded only when K^+ ions were present within the vesicles. Thus, proton transport was greatly diminished in media in which the K^+ ions were replaced by Na^+ ions or choline ions. However, when K^+-loaded vesicles were prepared, proton transport proceeded rapidly,
irrespective of the type of cation in the externa
medium. ATP hydrolysis-driven transport of H^+ i
was only moderately reduced when Cl^- ions were r
placed by glucuronate or SO_4^{2-} ions, suggesting
that Cl^- ions are not important in the exchange
H^+ and K^+ ions *per se*. However, the slow phase
observed in the time-course of ΔpH in the absenc
of Cl^- was similar to that observed in low K^+ me
This finding suggests that the equilibration of
during the 15 min preincubation prior to the add
tion of MgATP is decreased in the absence of Cl^-
ions. The cotransport of K^+ and Cl^- ions across
the luminal membrane of the parietal cell in par
lel with the H^+/K^+ exchange ATPase might be an i
portant mechanism for HCl secretion.

8028 EFFECT OF METABOLIC ACIDOSIS ON GASTRI
ACID SECRETION AND SERUM GASTRIN.

(En
Vogel, S. B.; Ishiguro, N.; Manabe, M.; Eisenber
M. M. (Univ. Minnesota Medical Sch., Minneapolis
MN). *Surg. Forum* 28:370-372; 1977.

The role of metabolic acidosis in acid secretion
and the effect of metabolic acidosis on direct
vagal parietal cell response and vagal antral
gastrin mechanisms of acid production was invest
gated. Gastric acid secretory and serum gastrin
level responses were determined in six mongrel
dogs with standard gastric fistulas during mild
(pH 7.2-7.3; 2% NH_4Cl infusion, 3-4 hr) and
severe (pH 7.1-7.2; 4% NH_4Cl infusion, 3-4 hr)
metabolic acidosis alone, following maximal
parietal cell (160 mg/kg/hr histamine) and
vagal (150 mg/kg, i.v., 2-deoxy-D-glucose [2DG])
stimulation, and following superimposition of pa
etal cell or vagal stimulation on mild or severe
acidosis. All experiments were repeated after t
dogs underwent truncal vagotomy. Peak acid outp
(PAO) in mild and severe acidosis was 7.4 ± 2.9
and 5.1 ± 2.3 mEq H^+/30 min, resp., and occurred
after 5-6 hr of NH_4Cl infusion. Truncal vagotom
produced a marked reduction of PAO in mild acido
but only a 50% reduction in severe acidosis (0.5
versus 2.2 ± 1.1 mEq H^+/30 min, resp.). Both m
and severe acidosis markedly reduced histamine-
stimulated gastric acid secretion (from 26.2 ±
to 19.7 ± 1.4 or 13.7 ± 1.5 mEq H^+/30 min, resp.
The 40% reduction in gastric acid secretion fol
ing truncal vagotomy was only slightly augmente
mild acidosis and was unaffected by severe acid
Only mild acidosis affected 2DG-stimulated acid
secretion; PAO after 2DG was 10.2 ± 3.4 mEq H^+/
min and rose to 18.6 ± 4.4 mEq H^+/30 min during
mild acidosis plus 2DG. Truncal vagotomy aboli
the effect of 2DG alone; but small yet importan
acid secretory responses persisted during mild
severe acidosis (1.4 ± 0.4 and 2.8 ± 1.2 mEq H^+
min, resp.). The serum gastrin level increased
a control value of 29 ± 3 pg/ml to 82 ± 17 pg/m
mild acidosis and to (34 ± 14)-(92 ± 17) pg/ml
(range) in severe acidosis; truncal vagotomy ab
ished these effects. 2DG stimulation increased
serum gastrin level (from 22 ± 6 to 49 ± 12 pg/
further increases occurred during mild (from 21
4 to 60 ± 13 pg/ml) and severe acidosis (from 2
4 to 96 ± 7 pg/ml) and were abolished by trunca

vagotomy. It is concluded that the effects of metabolic acidosis on gastric acid and serum gastrin responses depend largely on intact vagal pathways, that metabolic acidosis has a direct effect on parietal cells, and that NH$_4$Cl or acidosis either decreases the sensitivity of the parietal cell or interferes in the histamine-parietal cell axis.

8029 THE EFFECTS OF ASPIRIN AND OTHER NON-STEROID ANTI-INFLAMMATORY/ANALGESIC DRUGS ON GASTRO-INTESTINAL MUCUS GLYCOPROTEIN BIOSYNTHESIS IN VIVO: RELATIONSHIP TO ULCEROGENIC ACTIONS. (Eng.) Rainsford, K. D. (Univ. Tasmania Medical Sch., G.P.O. Box 252C, Hobart, Tasmania, 7001, Australia). *Biochem. Pharmacol.* 27(6):877-885; 1978.

The effects of aspirin and related nonsteroid anti-inflammatory (NSAI) drugs on the incorporation of radio-labeled precursors into mucus glycoproteins isolated from the rat gastrointestinal tract were studied. The p.o. administration of aspirin at 200 mg/kg caused a marked inhibition of the incorporation of $^{35}SO_4{}^{-2}$ into isolated gastric glycoproteins at 5 hr or later following drug administration. In contrast, glycoprotein synthesis inhibition was only evident 24 hr after the administration of the same dose of salicylic acid. Aspirin failed to inhibit the incorporation of L-[U-^{14}C]threonine or [1-^{14}C]acetate into proteins or glycoproteins, resp., when these labeled precursors were given i.p. 5 min after the drug. To consider the possibility that the diverse systemic effects of salicylates may alter the pattern of organ uptake or metabolism of labeled acetate, radioactive acetate was given p.o. 5 min after the aspirin dose. Aspirin inhibited the incorporation of radioactive acetate, but the total uptake of [1-^{14}C]acetate by the gastric mucosa tissue was also reduced under these conditions, suggesting that the apparent inhibitory effect could be due to variable effects of the drug on uptake of the radioactive acetate. Of the NSAI tested (i.e., diclofenac, flurbiprofen, indomethacin, suprofen, azopropazone, dextropropoxyphene napsylate, diflunisal, fenclofenac, flufenamic acid, naproxen, paracetamol, and sulindac), only indomethacin, diclofenac, flurbiprofen, and suprofen caused inhibition of $^{35}SO_4{}^{-2}$ incorporation into gastric mucosal glycoproteins. When correlated with the gastric ulcer indices of these compounds, it was evident that the more potent ulcerogenic drugs caused a statistically significant reduction in radiosulfate incorporation, whereas those with little or no ulcerogenic activity did not. All salicylates tested caused an inhibition of $^{35}SO_4{}^{-2}$ uptake into glycopeptides isolated from the gastric mucosa incubated *in vitro*, with salicylate being a more potent inhibitor than aspirin. Maximal gastric mucosal tissue concentrations of salicylates were achieved at 10-15 min after p.o. administration, which coincided with a peak of salicylates in the blood. Much lower concentrations of salicylates were present in the intestinal contents and mucosa compared with those in the stomach. There was a rapid and appreciable rate of hydrolysis of aspirin to salicylate in the gastric mucosa.

8030 EFFECT OF ELECTRIC VAGAL STIMULATION ON STRESS ULCER FORMATION IN RATS. (Eng.) Nagakawa, B.; Adler, R.; Fischer, C.; Matsumoto, T. (Hahnemann Medical Coll. & Hosp., 230 N. Broad St., Philadelphia, PA 19102). *Int. Surg.* 62(9):477-479; 1977.

8031 EFFECT OF SALBUMATOL ON ACUTE GASTRIC ULCERATION INDUCED BY INDOMETHACIN IN THE RAT. (Eng.) Fielding, L. P.; Raute, M.; Curwain, B. P. (St. Mary's Hosp. Medical Sch., Praed St., London W2 1NY, England). *Eur. Surg. Res.* 9(4):252-257; 1977.

8032 EFFECT OF PENTAGASTRIN ON GASTRIC MUCOSAL DNA AND RNA SYNTHESIS IN GUINEA-PIGS [Abstract]. (Eng.) Sewing, K. Fr.; Muller, D. (Dept. Pharmacology, Univ. Tubingen, Tubingen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):491; 1977.

8033 EFFECT OF ATROPINE ON ENDOGENOUS RELEASE OF SECRETIN AND ACTION OF SECRETIN ON PANCREATIC SECRETION [Abstract]. (Eng.) Kim, M. S.; Lee, K. Y.; Chey, W. Y. (Genesee Hosp., Rochester, NY 14607). *Fed. Proc.* 37(3):302; 1978.

8034 EFFECT OF SC-29333 ON GASTRIC MUCOSAL BLOOD FLOW AND SERUM GASTRIN IN THE DOG [Abstract]. (Eng.) Driskill, D. R.; Colton, D. G.; Phillips, E. L.; Poy, P.; Dajani, E. Z. (Searle Lab., Chicago, IL 60680). *Fed. Proc.* 37(3):373; 1978.

8035 THE VARIABLE EFFECTS OF METABOLIC ACIDOSIS ON H$^+$ ION BACK DIFFUSION IN THE CANINE STOMACH [Abstract]. (Eng.) Gurll, N. (Univ. Iowa Coll. Medicine, Iowa City, IA). *Clin. Res.* 26(2): 110A; 1978.

8036 ADENOSINE EFFECTS ON CHOLINERGIC NEUROTRANSMISSION IN THE RABBIT STOMACH IN VIVO [Abstract]. (Eng.) Gustafsson, L.; Hedqvist, P.; Fredholm, B. B.; Olundh, S. (Karolinska Inst., Stockholm, Sweden). *Acta Physiol. Scand.* 102(1): 69A-70A; 1978.

8037 A COMPARATIVE STUDY OF MUCUS FROM NORMAL, INTESTINALIZED GASTRIC MUCOSA AND FROM GASTRIC ASPIRATES OF PATIENTS WITH PERNICIOUS ANAEMIA. (Eng.) Schrager, J. (Royal Albert Edward Infirmary, Wigan, Lancashire, England). *Adv. Exp. Med. Biol.* 89:528-529; 1977.

8038 THE EFFECT OF BILE SALTS ON THE PHYSICAL PROPERTIES OF MUCUS. (Eng.) Marriott, C.; Kellaway, I. W.; Martin, G. P. (Dept. Pharmacy, Univ. Nottingham, University Park, Nottingham, NG7 2RD, England). *Adv. Exp. Med. Biol.* 89:509; 1977.

8039 STUDIES ON SERUM ENZYME MARKERS FOR GASTRIC MUCOSAL DAMAGE [Abstract]. (Eng.) Barayamil, H.; Waldron-Edward, D.; Greenberg, L. (Div. Surgical Res., McGill Univ., Montreal, Quebec, Canada). *Clin. Res.* 25(5):687A; 1977.

8040 FAT DIGESTION IN THE STOMACH OF PREMATURE INFANTS [Abstract]. (Eng.) Hamosh, M.; Sivasubramanian, K. N.; Salzman-Mann, C.; Hamosh, P. (Dept. Physiology, Georgetown Univ., Washington, DC 20007). *Physiologist* 20(4):40; 1977.

8041 A METHOD OF REVERSIBLE PYLORIC LIGATION FOR THE STUDY OF ULCER PRODUCTION AND HEALING [Abstract]. (Eng.) Ellert, M. S.; Jones, R. D. (Southern Illinois Univ. Sch. Medicine, Carbondale, IL 62901). *Physiologist* 20(4):25; 1977.

8042 COMPARATIVE ULCEROGENICITY OF MESECLAZONE AND OTHER NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAID) FOLLOWING ACUTE AND REPEATED ORAL ADMINISTRATION TO RATS [Abstract]. (Eng.) Diamantis, W.; Melton, J.; Sofia, R. D. (Wallace Lab., Cranbury, NJ 08512). *Fed. Proc.* 37(3):605; 1978.

8043 EFFECT OF VITAMIN C AND ASPIRIN ON ACUTE GASTRIC LESIONS IN THE RAT [Abstract]. (Eng.) Konishi, F.; Lo, G. (Southern Illinois Univ., Carbondale, IL 62901). *Fed. Proc.* 37(3):359; 1978.

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8045 BIOCHEMICAL CHARACTERIZATION OF DUODENAL ULCER: EFFECT OF PROPIONITRILE OR CYSTEAMINE ON TISSUE CATECHOLAMINES AND SEROTONIN LEVELS [Abstract]. (Eng.) Szabo, S.; Horner, H. C. (Peter Bent Brigham Hosp., Boston, MA 02115). *Fed. Proc.* 37(3):302; 1978.

8046 PHARMACOLOGY OF CP-26,154, A NOVEL ANTI-ULCER AGENT [Abstract]. (Eng.) Pereira, J. N.; Mears, G. A.; Leader, J. P.; Hohnke, L. A. (Central Res. Div., Pfizer, Inc., Groton, CT 06340). *Fed. Proc.* 37(3):302; 1978.

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8048 PREVENTION OF ENDOTOXIN-INDUCED GASTRIC DAMAGE BY LIDOCAINE [Abstract]. (Eng.) Greenberg, L.; Waldron-Edward, D.; Weksberg, A. (Div. Surgical Res., McGill Univ., Montreal, Quebec Canada). *Clin. Res.* 25(5):687A; 1977.

8049 DENERVATION HYPERSENSITIVITY OF THE GASTR PARIETAL CELLS AFTER A HIGHLY SELECTIVE VAGOTOMY [Abstract]. (Eng.) Ferrie, M.; Joffe, S. N. (Royal Infirmary, Glasgow G4 OSF, England). *J. Physiol. (Lond.)* 273(2):72P–73P; 1977.

8050 GLUCAGON AND SECRETIN IN ASPIRIN-INDUCED EROSIVE GASTRITIS [Letter to Editor]. (Eng.) Carmichael, H. A.; Nelson, L.; Russell, R. I. (Royal Infirmary, Glasgow, Scotland). *Br. Med. J.* 2(6102):1604; 1977.

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8052 PREVENTION BY MILD IRRITANTS OF GASTRIC NECROSIS PRODUCED IN RATS BY Na-TAUROCHOLATE [Abstract]. (Eng.) Chaudhury, T. K.; Robe A. (Upjohn Co., Kalamazoo, MI 49001). *Fed. Proc.* 37(3):303; 1978.

8053 EFFECT OF OSMOLALITY ON GASTRIC ACID SECR TION AND GASTRIC EMPTYING IN MAN. (Eng.) Swierczek, J. S.; Teichmann, R. K.; Rayford, P. L.; Thompson, J. C. (Univ. Texas Medical Branch, Galves ton, TX). *Surg. Forum* 28:349–350; 1977.

See also, 7974, 7981, 8110, 8132, 8133, 8134, 8165, 8232, 8253, 8260, 8266, 8270, 8271, 8272.

Pancreas

54 PANCREATIC SECRETION OBTAINED BY ENDOSCOPIC CANNULATION OF THE MAIN PANCREATIC
CT AND SECRETIN RELEASE AFTER DUODENAL ACIDIFICA-
ON IN MAN. (Eng.) Hanssen, L. E.; Osnes, M.;
ren, J. (Ulleval Hosp., Oslo, Norway). *Scand. J.*
stroenterol. 13(3):325-330; 1978.

e effect of acid in the duodenum on pancreatic
cretion of water, bicarbonate, and α-amylase and
the release of secretin was studied in 12 pa-
ents suffering from gastrointestinal disease but
ving normal endoscopic retrograde pancreato-
aphies. The main pancreatic duct was cannulated
th a teflon catheter by means of a side-viewing
odenoscope. Six of the patients received a du-
enal infusion of 40 ml of 100 mM HCl over 5 min;
e others served as controls for basal pancreatic
cretion. Pancreatic juice was collected for 20-
min in 5-min samples, and blood was drawn
intervals for immunoreactive secretin (IRS)
termination by radioimmunoassay. In the control
~~oup, no significant change~~ was observed in the
S level (range, 1.4 ± 0.3 to 1.9 ± 0.4 pM), bi-
rbonate concentration (range, 72 ± 5 to 73 ± 7
), bicarbonate output (range, 0.04 ± 0.02 to
06 ± 0.03 mmol/5 min), α-amylase concentration
ange, 464 ± 38 to 508 ± 36 kU/5 min), or the α-
ylase output (range, 0.3 ± 0.1 to 0.4 ± 0.2
/5 min). Duodenal acidification produced an
crease in the immunoreactive secretin level (IRS,
ak at 7 min of 15.8 ± 2.2 pM) and in the pancreatic
cretion of water and bicarbonate. In the third 5-
n sample, the maxima for pancreatic flow rate (11.5
.7 ml/5 min, $p<0.02$), bicarbonate concentration (122
6 mM, $p<0.02$), and bicarbonate output (1.4 ± 0.4
ol/5 min, $p<0.02$) were reached. After acidification,
e output of α-amylase was significantly ($p<0.02$)
gher and the concentration of α-amylase decreased,
aching its lowest point in the third 5-min sample
37 ± 22 kU/l, $p<0.02$). Using the improved
chnique of endoscopic cannulation of the main
ncreatic duct, the basal levels of pancreatic
cretion and those stimulated by HCl were deter-
ned. The observed rise in plasma IRS levels is
ought to be responsible for the increased pan-
eatic flow rate and bicarbonate output.

55 THE EFFECT OF PREDOMINANTLY α-ADRENERGIC DRUGS, INDIRECT SYMPATHOMIMETICS AND DOPA-
NE ON EXOCRINE PANCREATIC FUNCTION: STUDIES IN
E ISOLATED CAT PANCREAS. (Ger.) Heidbreder, E.;
eber, P.; Heidland, A. (Medizinische Universi-
tsklinik, Josef-Schneider-Strasse 2, D-8700 Wurz-
rg, W. Germany). *Res. Exp. Med. (Berl.)* 172(1):
-108; 1978.

e influence of predominantly α-adrenergic sub-
ances (norepinephrine, epinephrine [each 0.005-
6 μmol, perfusion], phenylephrine [0.3-0.6 μmol,
rfusion]), indirect sympathomimetics (ephedrine,
ramine [each 0.3-0.6 μmol, perfusion]), and dopa-
ne (0.3-0.6 μmol; perfusion) on the exocrine
nction of the isolated pancreas of adult cats
s studied. The injection of epinephrine and norepinephrine induced a rapid depression of flow rate and a simultaneous increase of the perfusion pressure. Phenylephrine, ephedrine, tyramine, and dopamine did not change the perfusion pressure or the hydrokinetic function (flow rate, calcium, and chloride secretion). The secretion of protein and enzymes was enhanced both in intact animals and in cats pretreated with reserpine (1-1.5 mg/kg, i.p.) or 6-hydroxydopamine (60 mg/kg, i.v.). The pancreatic protein secretion was inhibited by both α-adrenolytic and β-adrenolytic substances, as well as by tetracain (5×10^{-4} M, perfusion) and atropine (2.5×10^{-9}-2.5×10^{-7} M, perfusion). It is concluded that predominantly α-adrenergic substances stimulate pancreatic enzyme secretion.

8056 THE ACTION OF DOPAMINE ON BASAL PANCREATIC SECRETION IN MAN. (Ger.) Lankisch, P. G.; Koop, H. (Medizinische Universitatsklinik, Robert-Koch-Str. 40, 3400 Gottingen, W. Germany). *Dtsch. Med. Wochenschr.* 103(9):391-392; 1978.

The effect of dopamine (4 μg/kg/min, 45-min infusion) on basal pancreatic secretion was studied in five male volunteers. Dopamine failed to influence basal bicarbonate and enzyme (trypsin and amylase) secretion. This finding is contrary to observations in dogs, and indicates that dopamine may be infused for circulatory shock in acute pancreatitis without reservations.

8057 DIFFERENTIAL RATES OF DIGESTIVE ENZYME TRANSPORT IN THE PRESENCE OF CHOLECYSTOKININ-PANCREOZYMIN. (Eng.) Rothman, S. S.; Wilking, H. (Dept. Physiology, Univ. California, San Francisco, CA 94143). *J. Biol. Chem.* 253(10):3543-3549; 1978.

Previous studies in which a peptide mixture containing cholecystokinin-pancreozymin (CCK-PZ) had stimulated digestive enzyme secretion by the pancreas in a nonparallel manner were repeated using the original preparation, the pure CCK-PZ peptide, and a synthetic, biologically active, COOH-terminal octapeptide fragment of the whole molecule. When CCK-PZ was added to the medium bathing rabbit pancreas *in vitro*, digestive enzyme secretion was enhanced in a dramatic nonparallel fashion. Protein, trypsinogen, and chymotrypsinogen secretion all increased, but increases in the secretion of the two enzymes were strikingly dissimilar. For the peak period, trypsinogen secretion was increased 15 times the control rates, while chymotrypsinogen secretion was increased only about 4 times. This difference was maintained over the 3-hr course of the experiment and was seen over a considerable range of protein concentrations. The effect was stimulus-bound and could not be ascribed to any error in measurement. The response was essentially the same whether the pure CCK-PZ polypeptide or an impure mixture of peptides containing 25% CCK-PZ by weight was tested. Unlike CCK-PZ, acetyl-β-methylcholine (MCh) increased trypsinogen and chymotrypsinogen secretion in a roughly parallel or quantitatively equivalent fashion. Chymotrypsinogen output averaged 25 times the control rates at the peak, with increases as large as 125-fold, over 6 times the average peak response to CCK-PZ. Similarly, the COOH-terminal octapeptide fragment of CCK-PZ produced parallel stimulation of the digestive enzymes; the chymotrypsinogen output average 14 times the control rate for the peak period and increases as great as 100-fold were observed. Samples of CCK-PZ-stimulated secretion did not inhibit either chymotrypsinogen activation or chymotrypsin activity, and thus, the apparent paucity of chymotrypsinogen in CCK-PZ-stimulated secretion cannot be attributed to the secretion of an inhibitor of activity or activation in response to CCK-PZ. Since the digestive enzymes are apparently stored as mixed arrays within individual secretory granules, the differential secretion observed cannot be explained by the exocytosis of their contents.

8058 ACTION OF FATTY ACIDS ON THE EXOCRINE PANCREATIC SECRETION OF THE CONSCIOUS RAT: FURTHER EVIDENCE FOR A PROTEIN PANCREATIC INHIBITORY FACTOR.

(Eng.) Demol, P.; Sarles, H. (Institut National de la Sante et de la recherche medicale, 46 Chemin de la Gaye, Marseille 13009, France). *J. Physiol. (Lond.)* 275:27-37; 1978.

The inhibitory effect of the intraduodenal infusion of oleic acid on pancreatic protein secretion, observed in conscious bile duct-ligated rats, was investigated by determining which nutrients (i.e., pure oleic acid, sodium oleate dispersed in polysorbate 80, esterified oleic acid in the form of olive oil, caprylic acid, butyric acid, glucose, and NaCl) could induce this inhibition after the normal bile flow was reintroduced into the duodenum. In the first series of experiments, bile but not pancreatic juice was reintroduced. Pancreatic flow rate increased significantly during 60 min after starting an infusion of oleic acid, with a peak at 30 min (+37% of plateau); protein concentration increased slightly (+3.9%) at 30 min and then decreased rapidly and remained significantly decreased in comparison with basal values (-65% in the last experimental period). Sodium oleate dispersed in polysorbate 80 produced an increase in volume and decrease in protein similar to those seen with pure oleic acid. The volume increase with sodium caprylate was less than that with oleic acid; the initial increase in protein concentration and output was greater than with oleic acid but the delayed inhibition was less marked. Volume, protein concentration, and protein output increased slightly but not significantly during sodium butyrate infusion, and there was no delayed inhibition. When olive oil was infused, volume increased slowly and progressively and was significantly increased only during the last two periods. When both bile and pancreatic juice were reintroduced into the duodenum, the basal protein secretion was lower than in the first series. However, the decrease in protein concentration and output following the administration of oleic acid showed the same pattern as when pancreatic juice flow alone was diverted. The increase in volume produced by olive oil was delayed compared with the response to oleic acid but reached a slightly higher peak; pancreatic protein output was comparable to that seen after oleic acid infusion, and the delayed inhibition even more marked (-70%). No modification in vol or protein secretion was seen during or after 5% glucose or 0.9% NaCl infusion. A 30% glucose infusion produced a delayed increase in volume, wh was maximal 60 min after the end of infusion. P tein concentration remained stable. A 5.4% sali infusion induced a 32% decrease in protein conce tration but did not modify the volume. Delayed cretion produced by intraduodenal oleic acid infusion is not dependent on bile or pancreatic ju The action of oleic acid is not a pathological phenomenon. Fatty acids must be free or saponif but not esterified in the form of triglycerides produce the response.

8059 PANCREATIC RESPONSE AND PLASMA SECRET CONCENTRATION DURING INFUSION OF LOW DOSE SECRETIN IN MAN.

(Eng.) Schaffalitzky de Muckadell, O. B.; Fahrenkrug, J.; Watt-Boolsen, S.; Worning, H. (Bispebjerg Hosp., Bispebjerg Bakke 23, DK-2400 Copenhagen NV, Denmark). *Scan J. Gastroenterol.* 13(3):305-311; 1978.

To elucidate the physiological role of secretin in the regulation of pancreatic secretion, the secretin concentration in peripheral venous bloo and the bicarbonate secretion into the duodenum was measured in 10 normal human subjects during i.v. infusions of low doses of secretin. The du denum was intubated and fasting secretion of bicarbonate was measured during gastric aspiration Afterwards, pancreatic secretion was stimulated secretin at dose levels of 0.01, 0.03, 0.1, and 0.3 clinical U (CU)/kg/hr. The concentration of secretin in infusates (actual stimulation attain 85%) and in venous plasma was measured by radioi munoassay. The obtained increase in plasma secretin concentration (actual concentration minus fasting concentration) showed a linear correlati (r=0.915) with the measured secretin infusion rate. The median metabolic clearance rate was 15.7 ml/kg/min and the median half-life of exoge secretin was 3.8 min. Physiological plasma concentrations of human secretin (below 10 pM) were obtained at doses of secretin lower than 0.1 CU/ hr. The corresponding levels of bicarbonate secretion ranged from 0 to 22.93 mmol/hr. The sti ulated increase in bicarbonate concentration was linearly correlated (r=0.828) with the logarithm of the increase in venous concentration of secretin. The secretion of bicarbonate into the du denum was markedly higher than in the fasting st even at the lowest rate of stimulation (the medi concentrations were 0.41 pmol/hr during fasting, 1.35 pmol/hr at the 0.01-CU secretin dose, and 2 pmol/hr at the 0.30-CU secretin dose). The expe iments show that even low doses of secretin can stimulate bicarbonate secretion in the duodenum. The secretin assay can detect a significant increase in secretin concentrations during infusio of a dose as low as 0.01 CU/kg/hr.

8060 INHIBITION OF SECRETIN-STIMULATED EXOCRINE PANCREATIC SECRETION BY DIAZOXID IN THE RAT.

(Eng.) Pedrazzoli, S.; Dodi, G.;

Militello, C.; Favretti, F.; Brandstetter, S.; Lise, M. (Clinica Chirurgica Universita degli Studi, I-35100 Padova, Italy). *Eur. Surg. Res.* 10(1):33-39; 1978.

The effects of diazoxide, a known insulin inhibitor, on the basal, secretin-, and cholecystokinin-pancreozymin (CCK-PZ)-stimulated pancreatic exocrine secretion were studied in unanesthetized male Italicus rats. The rats were stimulated with an intra-aortic injection of secretin (18 U/kg), CCK-PZ (25 U/kg), or saline (1 ml, control). Doses of diazoxide (22.5 or 45 mg/kg) or saline (1 ml) were injected intra-arterially, 5 min before and 5 min after the stimulation. The volume of pancreatic juice and the protein and bicarbonate concentrations and outputs were determined at 10-min intervals. The basal pancreatic secretion was not modified by any of the doses of diazoxide used. Secretin significantly ($p<0.001$) increased the volume of pancreatic juice (from 5.16 ± 0.92 to 9.16 ± 1.72 μl/min) and the bicarbonate concentration (from 30.35 ± 3.9 to 47.49 ± 5.1 mEq/l) and output (from 156.60 ± 3.58 to 416.04 ± 6.70 mEq/min); these increases were inhibited by the higher dose of diazoxide while the lower dose reduced the volume response only. No significant variation in the pancreatic flow and bicarbonate concentration and output was seen in controls injected with diazoxide and saline or with saline only. Protein concentration and output were not significantly modified in rats treated with secretin or diazoxide or both. CCK-PZ significantly increased the protein concentration (from 2.47 ± 0.6 to 7.50 ± 0.95 g%, $p<0.001$) and protein output (from 77.73 ± 33.79 to 245.70 ± 38.90 μg/min, $p<0.01$). Diazoxide did not significantly influence these responses. Diazoxide did not modify the CCK-PZ-stimulated pancreatic secretion. The authors propose that the inhibition of insulin secretion by diazoxide may influence the interaction between secretin and the secretin receptors of the centroacinar and ductal cells. Direct action of diazoxide on these cells was ruled out because diazoxide did not modify the basal secretion. Since diazoxide inhibits the pancreatic exocrine response to secretin but does not modify the CCK-PZ stimulated secretion, it is suggested that insulin may have a permissive role on the secretin-stimulated pancreatic secretion.

8061 AMYLASE AND LIPASE SECRETION INTO BILE. (Rus.) Korotko, G. F.; Kurzanov, A. N. (Dept. Physiology and Biophysics, State Medical Inst., Andizhan, USSR). *Fiziol. Zh.* 64(1):81-89; 1978.

8062 PANCREATIC ACINAR CELL METABOLISM AND FUNCTION. (Eng.) Webster, P. D., III; Black, O., Jr.; Mainz, D. L.; Singh, M. (Veterans Admin. Hosp., Augusta, GA 30904). *Gastroenterology* 73(6): 1434-1449; 1977.

8063 NEUROHORMONAL CONTROL OF PANCREATIC SECRETION: A REVIEW. (Eng.) Singh, M.; Webster, P. D., III (Veterans Admin. Hosp., Augusta, GA 30904). *Gastroenterology* 74(1):294-309; 1978.

8064 FREE FATTY ACIDS AND LIPOLYTIC ACTIVITY OF THE PANCREAS OF IRRADIATED RATS. (Eng.) Kocmierska-Grodzka, D. (Inst. Physiology and Biochemistry, Medical Acad., 15-222 Bialystok, Poland). *Pol. J. Pharmacol. Pharm.* 29(5):533-539; 1977.

See also, 7995, 8047, 8115, 8132, 8396.

SECRETION AND METABOLISM

Hepatobiliary Tract

8065 DETERMINATION OF THE BILIARY TREE CAPACITY OF THE RAT IN ITS DISTENDED AND NONDISTENDED STATE USING ^{35}S-SULFOBROMOPHTHALEIN GLUTATHIONE (^{35}S-BSP-GSH) AS A MARKER. (Eng.) Dammann, H. G. (I. Medical Clinic, Univ. Hamburg, 2 Hamburg 20, W. Germany). *J. Physiol. (Paris)* 73(1):37-46; 1977.

BSP-glutathione was used as a marker to measure the biliary tree volume of male Wistar rats. Two methods were used to calculate the volume in the distended and nondistended state; one method is a modification of a previously described method in which biliary dead space is calculated as the volume of bile collected between the i.v. injection of ^{35}S-BSP-glutathione and its appearance in collected bile, while the other is a new method based on the assumption that the first measurable radioactivity following marker injection indicates the time of appearance of the injected marker in the right and left hepatic duct. The biliary tree capacity in the nondistended state was only 77.8% of that reported in previous studies when determined by the first method and 72% of previous values when determined by the second method. The values were 30.4 ± 5.2 and 20.0 ± 3.7 μl by the first and second methods, resp., corresponding to 2.49 ± 0.37 and 1.67 ± 0.42 μl/g liver; the differences between the values obtained by the two methods were statistically significant in both cases ($p<0.05$). The distended biliary tree volume was determined two different ways. In one set of experiments, ^{35}S-BSP-glutathione was injected i.v. 2-3 sec before terminating a 15-min biliary obstruction; in the other experiments, the injection was administered 60 sec before terminating the struction. The new method for calculating biliary volume was used in both cases. The distended volume calculated after injecting the marker 2-3 sec before terminating biliary obstruction was 69.8 ± 7.1 μl or 5.07 μl/g liver, whereas the values obtained after injecting the marker 60 sec before terminating the obstruction were 59.6 ± 6.7 μl and 4.24 ± 0.94 μl/g liver. These levels were all significantly lower ($p<0.05$) than those calculated using the previously published method (119.8 ± 12.7 μl and 8.84 μl/g liver). The capacity was also significantly lower when the marker was injected at 60 sec than at 2-3 sec. It is concluded that determining biliary tree volume by administering the marker 60 sec before terminating an obstruction gives a more accurate estimate of the true biliary tree capacity in the distended state.

8066 EXPERIMENTAL STUDIES ON CONTINUOUS HYPOTHERMIC LIVER PERFUSION WITH A SYNTHETIC SOLUTION CONTAINING GELATIN POLYPEPTIDES (HAEMACCEL).

(Eng.) Fuller, B. J.; Attenburrow, V. D.; Newsome, C. (Royal Free Hosp. Sch. Medicine, London, England). *Cryobiology* 15(3):279-289; 1978.

A rat liver model was used to study preservation by continuous hypothermic perfusion, and experiments were designed to investigate whether changing the perfusion pressure would alleviate the problems of increased resistance to flow encountered during hypothermic liver perfusion. Perfusion for 5 or 24 hr with a defined solution containing Haemaccel as colloid at a temperature of 5-7 C was found to result in good preservation of the metabolic activity of the livers, as assessed by the ability of the tissue to synthesize urea (8.89 ± 1.34 μmol/g at 5 hr, 7.18 ± 1.23 μmol/g at 24 hr; both perfusions at 20 cm H_2O) and to take up galactose (40.78 ± 4.83 μmol/g at 5 hr, 34.76 ± 5.36 μmol/g at 24 hr). In common with other continuous perfusion methods, there was increasing evidence of cell damage as perfusion progressed; at 5 hr, biopsy specimens showed clearly visible sinusoidal channels and a well preserved chain-like formation of the hepatocytes, whereas at 24 hr, there were regions in which the sinusoidal spaces were small or indistinguishable, even though the adjacent branches of portal vein, artery, and central vein were patent. In addition, there was a depletion of cellular K^+ ($p<0.05$) and an increase in tissue water content ($p<0.01$) in 24-hr perfused livers compared with 5-hr perfused livers. There was a considerable increase in vascular resistance, as indicated by a fall in flow rate at a constant pressure, in the later stages of perfusion; flow rate after 24 hr was reduced to approximately 30% of that after 5 hr. Further studies are necessary to analyze, in a controlled fashion, the nature of the damage incurred by the liver during storage and the requirements for maintenance of a viable graft by hypothermia.

8067 CORRECTION OF HEPATOCELLULAR DYSFUNCTION DURING ENDOTOXEMIA.

(Eng.) Heimberger, S. L.; McDougal, W. S.; Wilmore, D. W.; Pruitt, B. A., Jr. (United States Air Force Medical Center, Ke sler Air Force Base, MS 39534). *J. Surg. Res.* 24 (5):442-448; 1978.

Because endotoxin exerts a variety of effects on physiologic function, a nonlethal endotoxemia model was established in dogs to examine its effect on th alterations in transport function of the hepatocyte Indocyanine green (ICG) was used as a clearance marker of hepatic membrane transport, and the impact of energy substrate on hepatic transport was determined. No change in hepatic blood flow, plasma volume, or blood pH or gas concentrations was observed following the i.v. injection of *Escherichia coli* endotoxin, given as 0.1 mg/kg body weight of lipopolysaccharide followed by a 0.05-mg/kg/hr infusion for 2 hr. However, marked alterations in the kinetics of ICG occurred following administration; the initial rapid extraction reflecte by the K_1 rate constant decreased ($p<0.001$) and back diffusion, thought to suggest increased membrane permeability (reflected in part by the K_2 constant), increased ($p<0.01$). These alterations in dye clearance suggest a direct effect of endotoxin on hepatocyte transport, substantiating the earlier observations of similar changes that occur in bacteremic, thermally injured patients. The alterations in hepatic energetics were returned to normal by the simultaneous administration of a 50% glucose solution (2 g/kg) and insulin (0.2 U/kg), followed by an infusion of 0.5 g glucose/kg/hr and 0.2 U insulin/kg/hr. In this model system, endotoxin is thought to have a direct effect on the hepatocyte, markedly altering cellular energetics and hepatocyte transport, and its action may accour for the progressive changes in hepatic function tha are frequently observed in critically ill infected patients.

8068 THE USE OF FINE-NEEDLE ASPIRATION BIOPSY FOR THE DIAGNOSIS OF HEPATIC STEATOSIS IN RATS.

(Eng.) Boelsterli, U.; Zbinden, G. (Inst Toxicology, Univ. Zurich, Schorenstrasse 16, 8603 Schwerzenbach, Switzerland). *Toxicol. Lett.* 2(1): 35-43; 1978.

The value of fine needle aspiration biopsy (FNAB) for the examination of experimental liver lesions in small laboratory animals was investigated in male ZUR:SIV-Z strain rats with experimental fatty liver. Rats were fed a high fat diet (39.7% butter, 5% cholesterol) with or without simultaneous treatment with chlortetracycline (80 mg/kg, intragastrically, 5 times/week), and FNAB was performed on days 2, 4, 8, and 16 of treatment. The specimens were stained with the Masson-Goldner and Van Gieson methods (MGG) or with hematoxylin and Fettr 7B. The appearance of these biopsy specimens was compared with that of specimens obtained at necrop and stained by the same methods. After MGG staining, the cytoplasm of the cells taken by FNAB from the untreated control rats had a fine granular appearance. Stainable fat was not increased in the

hlortetracycline-treated rats receiving a normal
iet. In animals fed the high fat diet, with and
ithout chlortetracycline, diffuse vacuolization
as seen in the MGG-stained smears, and a distinct
ccumulation of fat droplets was seen in cells
tained with Fettrot 7B and hematoxylin. This
ccumulation was seen even after 2 days, and the
umber of fat droplets increased over the study
eriod. The degree of fatty change was scored
sing arbitrary units in both the specimens taken
y biopsy and those taken at necropsy. Scoring
as identical in both the biopsy and necropsy speci-
ens in 60% of the cases. In 38%, scoring differed
y 1 unit, and the higher score was usually ob-
ained in the necropsy slide. The scores in the
wo specimens differed by 2 units in only two cases.
he safety of FNAB was confirmed by repeated punc-
ure of the same liver lobe (40 punctures in 10
eeks). This treatment resulted in small necroses
nd hemorrhages that were rapidly organized without
ignificant distortion of the liver structure. It
ppears that FNAB is useful in detecting early
orphologic liver changes and in monitoring their
rogression, without the necessity of sacrificing
arge numbers of animals.

069 A COMPARISON OF METHODS FOR BILE SALT POOL SIZE MEASUREMENTS IN THE PRAIRIE DOG ALLSTONE MODEL.

(Eng.) Meyer, P. D.; DenBesten, L.
Veterans Admin. Hosp., Iowa City, IA 52242). *Proc.
oc. Exp. Biol. Med.* 156(3):452-456; 1977.

modified isotope-dilution technique for measuring
ile salt pool size was compared with the wash-out
echnique in the prairie dog gallstone model.
nolelithiasis was induced by feeding high-choles-
erol chow. Fasting animals received ^{14}C-labeled
nolic acid i.v. and a gavage feeding of a lipid-
rotein emulsion to stimulate gallbladder contrac-
ion. Twelve hours later, the cystic duct was
igated, and the common duct was cannulated. Gall-
ladder bile salt and bile salt from the first per-
od hepatic collection were determined by mass, and
adioactivity was also determined. The radioactivity
dministered was corrected for losses by mul-
iplying by e^{-kt}, where k is the fractional pool
oss per unit time (t). The previously reported
sotope-dilution technique (which mathematically
ssumes no losses, so that k=0 and e^{-kt}=1) was
sed to estimate pool size in computing k; the
aily synthesis rate was assumed to be 24 times the
ourly synthesis rate as determined after wash-out.
ne radioactivity from gallbladder bile and the
irst collection of hepatic bile was subtracted
rom this corrected radioactivity. This computa-
ion yields the radioactivity actually contained
n the animal after the first hepatic bile collec-
ion. This radioactivity is divided by the spe-
ific activity of bile salt from the second-period
epatic bile collection; this constitutes the "pool
emaining" in the animal after the first-period
epatic bile collection. The sum of the bile salt
n the gallbladder, first-period hepatic bile,
nd pool remaining constitutes the total bile salt
ool. The bile acid pool as calculated by the
odified isotope-dilution technique was 333 ± 104
µmol in controls and was 276 ± 84 µmol as calculated by washout. The average basal synthesis rate was 2.51 ± 1.16 µmol/hr, determined as the "plateau" of the wash-out curve. The difference between the two methods varied in magnitude but was consistent and statistically significant ($p<0.001$). The pool size as measured by isotope dilution was 431 ± 137 µmol, and by wash-out was 357 ± 120 µmol ($p<0.001$). Basal synthesis rate was 2.45 ± 1.06 µmol/hr. Wash-out pools corrected for recovery of radioactivity agreed very well with pools calculated by isotope dilution. These studies indicate that the modified isotope-dilution technique yields values for bile salt pool sizes consistently higher than those of the wash-out technique. The observed differences in pool size measurement apparently reflect an underestimation by the wash-out technique, possibly due to some portion of the pool, previously equilibrated with exogenous isotope, being unavailable for "wash-out" and measurement.

8070 REGULATION OF THE VOLUME OF ISOLATED RAT HEPATOCYTES IN HYPOOSMOTIC MEDIUM.

(Fre.) Poggioli, J.; Mazet, J. L.; Claret, M. (Laboratoire de Physiologie comparee et de Physiologie cellulaire, C.N.R.S. Universite Paris-XI, 91405 Orsay, Paris, France). *C. R. Acad. Sci.* [*D*] *(Paris)* 285: 1467-1470; 1977.

Changes in the volume of isolated rat hepatocytes were studied 2 min to 2 hr after incubation in minimum essential medium (MEM, 37 C, pH 7.4) with NaCl concentrations ranging from 0 to 256 mM. The effect of ouabain addition (10^{-3} M) to the MEM was also observed. MEM with 185 mM NaCl increased cell volume to 150% immediately after incubation; the cell volume decreased to 106% of the initial volume after 1 hr of incubation. MEM with 92 mM NaCl increased cell volume to 260% of the inital volume after 2 min of incubation; it decreased to 150% of the initial volume 2 hr after incubation. Ouabain had no effect on the initial increase in cell volume induced by NaCl; ouabain only slightly affected the long-term change in cell volume with MEM containing 185 mM NaCl and had no effect on the cell volume with MEM containing 92 mM NaCl. Potassium and amino acid losses from the cells were 82 nmol/mg and 60 nmol/mg, resp., after 150 min. Thus, potassium or amino acid loss from the hepatocytes incubated in MEM with NaCl had no effect on the regulation of hepatocyte volume. The authors suggest that other mechanisms, such as a sodium pump (as in the kidneys), a contractile membrane system, or a decrease in the activity of osmotic particles by their binding to intracellular sites, may be involved in the regulation of hepatocyte volume.

8071 DEMONSTRATION OF AUTOANTIBODIES IN LIVER DISEASE USING INDIRECT IMMUNOFLUORESCENCE.

(Ger.) Storch, W. (Neurologische Klinik, Karl-Marx Universitat, Karl-Marx-Stadter-Strasse 50, DDR-7039

Leipzig, E. Germany). *Dtsch. Gesundheitsw.* 33(6): 257-265; 1978.

A synopsis of antibodies that appear in liver disease is presented. Antibodies are considered to be of diagnostic value and may provide information about pathogenesis, etiology, therapy, course of the disease, and prognosis. The antibodies, demonstrable by indirect immunofluorescence, include those against nuclear material (antinuclear factors), mitochondria, smooth muscle, microsomes, connective tissue, endothelium, bile ducts, bile duct epithelium, bile canaliculi, hepatic cytoplasm, immunoglobulins, thyreoglobulins, microsomal thyroid antigen, parietal cells, brush borders of proximal tubules in rat kidneys, lymphocytes and thrombocytes, collecting tubules, loop of Henle cells, and various proximal and distal renal tubule cells. Demonstration of humoral autoantibodies indicates that the tolerance to those particular antigens has been decreased. In liver disease, especially in chronic aggressive hepatitis, there are various groupings of disease, which may or may not be associated with antibodies. In differential diagnosis, specific antibodies demonstrated may be informative in cases of acute viral hepatitis, icterus of unknown etiology, chronic active hepatitis, lupoid hepatitis, and hepatitis of viral origin. Antibodies detected may provide clues about the identity of some forms of hepatitis responding to immunosuppressive therapy, about some forms possibly correlated with alpha-1-antitrypsin deficiency, and about the presence of active lupus erythematosus disseminatus.

8072 PREFERENTIAL LOCALIZATION OF RADIOLABELED LIPOSOMES IN LIVER.

(Eng.) Hinkle, G. H.; Born, G. S.; Kessler, W. V.; Shaw, S. M. (Tulsa Medical Coll., Tulsa, OK 74114). *J. Pharm. Sci.* 67(6):795-798; 1978.

Liposome formulations were studied to achieve an efficient entrapment procedure for the production of liposomes of ^{99m}Tc-pentetic acid (^{99m}Tc-I). The entrapment efficiency was studied by separation of the product using column chromatography. The mean percentage of ^{99m}Tc-I activity in the liposome fractions of negatively charged liposomes, as calculated from a total of six entrapment studies, was 1.86 ± 0.34%. The mean percentage of ^{99m}Tc-I activity in the liposome fractions of positively charged liposomes, as calculated from 12 entrapment studies, was 8.14 ± 1.66%. A 60-min sonication time produced significantly lower ($p=0.05$) entrapment yields than did 15-, 30-, and 45-min times, which did not differ from each other significantly. The particle size range of the prepared liposomes was evaluated using electron microscopy. Studies of liposomes contained in the first fraction after the void volume in gel filtration showed the presence of liposomes ranging from 0.1 to 2 µm in diameter. Successive fractions contained small-diameter liposomes, which remained in the circulation for extended periods. Entrapment techniques and separation procedures led to a liposome preparation with particles in the colloidal size range (0.001-0.5 µm). Dramatic differences in the orga
distribution of the liposome preparation in mice were produced when different particle size ranges were injected. Liposomes eluted in the first fraction after the void volume led to a maximum uptake by the liver and spleen 10 min after i.v. injection. Liposomes from pooled fractions provided less than half of the activity in the liver
as did the narrow size range liposome preparation
Investigations concerning improvement of the entrapment yield along with the production of a liposome product with an increased radioactive concentration are being planned. In addition, decreasing the labeling procedure time, which could lead to the development of a kit preparatio
suitable for human use, is being studied.

8073 RESOLVING BIOCHEMICALLY THE HEPATOCYTE' MULTIFUNCTIONAL PERICELLULAR MEMBRANE.

(Eng.) Evans, W. H. (Natl. Inst. Medical Res., Mill Hill, London, England). *Trends Biochem. Sci*
2(3):169-171; 1977.

Studies concerning the hepatocyte pericellular me
brane are reviewed. This membrane is complex and can be subfractionated to yield plasma membrane fractions from the blood sinusoidal, contiguous, and bile canalicular regions. The blood sinusoidal region is microvillar and accounts for 40-50% of surface area. Plasma membranes are vesicl
of density 1.11-1.14 g/cm^3 in sucrose and are rec
ered mainly from microsomal fractions; this regio
identified by perfusing the liver with ^{125}I-ligan
It has a high sialic acid and glycoprotein conten
The contiguous region accounts for 30-40% of surface area; here the plasma membranes are of densi
1.16-1.18 g/cm^3. Intercellular junctions are pre
Biochemical properties include a low glycoprotei
and glycolipid content and prominent gap-junctio
polypeptides; this region has the lowest specifi
activities of plasma membrane marker ecto-enzymes
The canalicular region is microvillar and account
for about 10% of surface area. These plasma membranes are isolated as canalicular complexes (den
sity 1.16-1.18 g/cm^3) or vesicles (density 1.13
This region has the highest specific activities
plasma membrane marker ecto-enzymes, cholesterol and sphingomyelin level. There is little activat
of adenylate cyclase by glucagon, and there is a high sialic acid and glycoprotein content. Seve
studies have indicated that radioactivity first associated with macromolecules at the hepatocyte'
Golgi apparatus is later found at the blood sinus
oidal region of the pericellular membrane. Thus, it may be assumed that plasma membrane glycoproteins, after their insertion into the blood sinus
oidal plasma membrane, can then redistribute late
ally. Such a mechanism would explain the lower concentration of glycoproteins generally in plas
membranes derived from the lateral region of cel
relative to membranes derived from microvillar a
brush border areas. However, a major unresolved problem concerns the extent to which plasma membrane specializations constrain lateral redistribution of components.

074 IDENTIFICATION OF ERYTHROPOIETIN PRODUCING CELLS IN FETAL MOUSE LIVER CUL-
URES. (Eng.) Gruber, D. F.; Zucali, J. R.; Mir-
nd, E. A. (Roswell Park Memorial Inst., 666 Elm
t., Buffalo, NY 14263). *Exp. Hematol.* 5(5):392-
98; 1977.

orphological studies were carried out to identify
he fetal hepatic cell responsible for the produc-
ion of erythropoietin in culture. Fetal mouse
iver explants produced measureable amounts of
rythropoietin in the culture media. Erythropoi-
tin was first detected in pooled medium between
ays 2 and 7 of culture; the amount increased with
ime and was greatest between days 15 and 21. The
ddition of anti-erythropoietin to the 15-21 day
ulture medium neutralized the erythropoiesis-
timulating capability of the culture. Immuno-
luorescent and carbon particle ingestion tech-
iques suggest that the erythropoietin is elaborated
 macrophages or Kupffer cells of the hepatic retic-
loendothelial system.

75 THE BIOCHEMICAL PREREQUISITES FOR PREVENTING PATHOGENIC LYSOLECITHIN ACTIVITY
 THE HUMAN GALLBLADDER. II. STUDIES ON THE SUB-
ELLULAR LOCALIZATION OF LYSOPHOSPHOLIPASE. (Eng.)
agesson, C.; Sjodahl, R. (Dept. Medical Micro-
iology, Univ. Linkoping, S-581 85 Linkoping, Swe-
en). *Scand. J. Gastroenterol.* 13(1):107-112;
978.

e subcellular localization of lysophospholipase
ctivity in the human gallbladder epithelium was
udied by differential and density gradient cen-
rifugation to determine whether the presence of
is enzyme could protect the gallbladder wall
gainst potentially pathogenic lysolecithin. Dif-
erential centrifugation revealed that lysophos-
olipase was enriched both in the lysosomal mito-
ondrial fraction (20,000 x *g* pellet) and in the
icrosomal fraction (100,000 x *g* pellet). The
ighest relative specific activity (2.27) was found
 the microsomal fraction, whereas most of the
zyme activity (56%) was recovered from the lyso-
mal mitochondrial fraction. The soluble frac-
ion (100,000 x *g* supernatant) contained only 6%
 the total activity. Although the cytosol did
t contain any significant lysophospholipase ac-
ivity, large amounts of enzyme were solubilized
ring sucrose density gradient centrifugation.
e findings suggest that a widespread subcellular
istribution of lysophospholipase in the gall-
ladder epithelium serves a physiologically favor-
le purpose. The authors suggest that one purpose
 to prevent the development of acute aseptic
olecystitis, but that this result is not achiev-
le in cases in which the gallbladder epithelium
 mechanically injured by an impacted stone.

76 THE BILIARY EXCRETION OF BUCOLOME IN THE RAT: A POSSIBLE CAUSE FOR CHOLERESIS.
Eng.) Kitani, K.; Nokubo, M.; Kanai, S.; Miura,
.; Uesugi, T. (Tokyo Metropolitan Inst. Gerontology, 35-2 Sakaecho, Itabashiku, Tokyo 173, Japan). *Biochem. Pharmacol.* 26(24):2457-2461; 1977.

Because the mechanism of bucolome (BC)-induced choleresis has not been elucidated, the possibility that BC or its metabolite(s) might induce osmotic choleresis when excreted into the bile was examined by measuring the extent of such excretion in anesthetized 10-week-old male Wistar rats. Following i.p. administration of ^{14}C-BC mixed with carrier BC (20 mg/100 g body weight), the common bile duct was cannulated, and seven successive 15-min bile samples were collected beginning 15 min after BC injection. In a second group of rats cannulation occurred before BC administration, and 15-min samples were collected for 2 hr. In both groups, a previously-cannulated femoral artery provided arterial blood samples at various intervals. The highest average plasma BC level was 0.47 mg/ml in group I rats and 0.3 mg/ml in group II rats. The total biliary excretion of BC (a percentage of the administered dose) was 19.0 ± 4.0 in group I rats and 24.5 ± 4.0 in group II rats from 15 min to 2 hr of sampling. A significant ($r=0.85$) linear relationship was observed between bile flow rate and the bile excretion rate of BC, 27 µl of bile being produced for each µmole of BC excretion. These results indicate that in rats BC excretion in bile could be a major cause of choleresis, possibly due to the osmotic force of the excreted BC. It is possible that, in animals without a bile fistula, the enterohepatic circulation of BC could maintain a higher plasma BC level than that encountered in this study.

8077 METABOLISM OF THE CARCINOGEN CHROMATE BY RAT LIVER MICROSOMES.
(Eng.) Gruber, J. E.; Jennette, K. W. (Dept. Chemistry, Dartmouth Coll., Hanover, NH 03755). *Biochem. Biophys. Res. Commun.* 82(2):700-706; 1978.

Studies were carried out to determine whether the oxidation state of chromium is affected in its metabolism by the rat liver microsomal systems, since the oxidation state of this element has been previously shown to be very important in determining the carcinogenicity and mutagenicity of chromium compounds and their effect on DNA synthesis. Incubation of chromate (4.0×10^{-4} M) with rat liver microsomes and 0.025 M NADPH resulted in reduction of hexavalent chromium to trivalent chromium. In the absence of NADPH, no reduction occurred. The amount of chromium reduced in the presence of NADPH depended on the concentration of the microsomes. With a microsomal protein concentration of 1.5 mg/ml, essentially complete loss of chromate was observed after 6 hr of incubation. Chromate reduction was also dependent on the concentration of NADPH. Maximum conversion to chromium III occurred at a NADPH concentration of 1.44×10^{-3} M upon incubation with 1.5 mg/ml microsomes for 6 hr. Time course studies at these concentrations showed that chromate was completely reduced to chromium III. Incubation of chromate with microsomes in the absence of NADPH led to complete recovery of chromate even after 24 hr incubation, indicating that chromate did not oxidize any components of the microsomal system under these conditions. In the absence of microsomes, less than 20% of the chromate was reduced by NADPH, compared with a greater than 98% reduction with NADPH and microsomes. These results suggest that an NADPH-requiring enzyme or enzyme system is involved in the *in vitro* metabolism of chromate. The results of this study, together with those of previous studies, suggest that chromium III may be the ultimate carcinogenic form of chromium.

8078 EFFECT OF EXPERIMENTAL MALNUTRITION ON CORTICOSTEROIDS AND LIVER CYTOPLASMIC RECEPTORS IN RATS.

(Eng.) Kadival, G. V.; Samuel, A. M. (Tata Memorial Hosp., Parel, Bombay 400 012, India). *Biochem. Med.* 18(3):353-359; 1977.

Adrenocortical function was studied in experimental malnutrition in male Wistar rats. Plasma corticosterone levels, liver cytosol binding capacity, and affinity binding constants were estimated in animals sacrificed on days 15, 21, and 28 after starting a low-protein (1% casein) diet. These parameters were also estimated in another group of animals that had been fed the low-protein diet for 4 weeks and were then given a normal diet; these animals were sacrificed on the 7th, 15th, and 21st days of repletion. Serum albumin levels declined markedly from control levels by the 15th day of the low-protein diet. Plasma corticosterone, liver cytosol binding capacity, and affinity constants for the cytosol binding protein remained unchanged during hypoalbuminemia and during replacement with the normal diet. Starvation was associated with hypertrophy of the adrenal glands, which was reflected by an increase in the weight of these glands. The weight returned to normal within 2 weeks on a normal diet. It is concluded that, even during progressive phases of malnutrition, the corticosteroid levels are maintained within normal limits, probably by a compensatory hypertrophy of the adrenal glands. The liver cytosol binding proteins are within normal limits and thus do not reduce the effectiveness of the biological action of corticosteroids.

8079 EFFECTS OF HEPATOTOXIC AGENTS ON HEPATIC MICROSOMAL METABOLISM OF ESTROGENS IN THE RAT.

(Eng.) Lopez del Pino, V.; Bolt, H. M. (Institut fur Toxikologie der Universitat Tubingen, Wilhelmstr. 56, D-7400 Tubingen 1, W. Germany). *Arzeim. Forsch.* 27(11):2117-2120; 1977.

The effects of carbon tetrachloride- and ethanol-induced liver damage on the activities of the microsomal enzymes involved in estrogen metabolism were investigated in the livers of male Wistar rats. The animals were treated with ethanol, either acutely (6 ml/kg, p.o., and a 40% volume/volume aqueous solution) or chronically (20% volume/volume ethanol in drinking water for 100 days), or with CCl_4 (2.5 or 5 ml/kg of a 50% solution, p.o.); in further experiments rats received a single dose of thioacetamide (100-300 mg/kg). Acute or chronic ethanol pretreatment had no effect on the levels of liver microsomal cytochrome P-450, but acute and chronic treatment significantly reduced NADPH-cytochrome c reductase activity ($0.0125>p>0.01$) in comparison with control levels. Acute treatment decreased mestranol demethylation significantly ($0.01>p>0.00$ and chronic treatment decreased demethylation even further ($p<0.0005$). Acute or chronic ethanol trea ment had no effect on the aromatic hydroxylation o estradiol, as indicated by microsomal replacement of tritium from 2,4,6,7-^{3}H-estradiol. More severe liver damage by CCl_4 or thioacetamide was associat with a reduction in microsomal cytochrome P-450 ($0.01>p>0.005$ and $0.0025>p>0.0005$ for 2.5 and 5.0 kg CCl_4 doses, resp.; $0.05>p>0.025$ and $0.0025>p>0.$ for various thioacetamide doses), whereas NADPH-cytochrome c reductase was not significantly dimin ished. Demethylation of mestranol was significant inhibited by 2.5 and 5.0 ml/kg CCl_4 ($0.0125>p>0.01$ and $0.05>p>0.025$, resp.), as was aromatic hydroxyl tion of estradiol ($0.05>p>0.025$ and $0.0025>p>0.000$ resp.). Although chronic thioacetamide treatment has been previously reported to decrease microsoma aromatic estrogen hydroxylation, a single dose (20 or 300 mg/kg) caused increased microsomal formatio of estrone from estradiol ($0.0025>p>0.0005$ or 0.00 $p>0.0025$, resp.), which is regarded to be a more lipophilic substrate for the microsomal estrogen 2 hydroxylase than is estradiol. These data show t hepatotoxic agents may act differentially on hepatic metabolism of endogenous steroids.

8080 PATHWAYS OF ETHANOL OXIDATION IN HEPATIC MICROSOMES OF ACATALASEMIC (Csb) MICE.

(Eng.) Vatsis, K. P.; Schulman, M. P. (Univ. Illinois Medical Center, Chicago, IL 60612). *Adv. Exp. Med. Biol.* 85A:303-317; 1977.

A previous study suggesting that NADPH-dependent ethanol oxidation by hepatic microsomes (MEOS) is independent of catalase activity was reinvestigated using the same techniques in genetic control (Csa) and acatalasemic (Csb) mice. Csa a Csb microsomes kept in an ice bath at 0-4 C and s sequently incubated at 25 C or 30 C for 10 min showed identical MEOS and catalase activities, whereas incubation of similar preparations at 37 for 10 min led to a 20-35% loss of catalase and a 10-30% decrease in MEOS activities of Csb as compared with corresponding activities in Csa mice. Based on these observations, MEOS assays were uniformly carried out at 30 C (10 min), regardles of microsomal origin or pretreatment. Preincubation of Csb microsomes at 42-44 C for 15 min resulted in 97-99% inactivation of catalase activit and a concomitant 60-70% loss of MEOS activity; neither the catalase nor MEOS activity of Csa microsomes was affected by this procedure. Preincubation at 43 C for 15 min had no effect on NADPH-linked drug-metabolizing activities of Csa or Csb microsomes. MEOS activity of "zero-time" microsomes from either strain, or of 43 C-preincubated Csa microsomes, was inhibited 40% by 0. mM propylpyrazole, a potent inhibitor of alcohol dehydrogenase. Due to the presence of peroxidatically-uncoupled catalase in 43 C-preincubated

Csb microsomes, residual MEOS activity in these preparations was unaffected by 0.1 mM cyanide or azide, but was totally obliterated by 0.03 mM propylpyrazole. In contrast, the same concentration of propylpyrazole produced only a 10% inhibition of NADPH-dependent aniline p-hydroxylation and aminopyrine, ethylmorphine, and benzphetamine *N*-demethylation activities of "zero-time" or of 43 C-preincubated microsomes from either strain. Incubation of Csb microsomes for 10 min at 37 C or 30 C resulted in catalase activities that were 72% and 102%, resp., of those obtained with similarly incubated Csa microsomes. Furthermore, incubation of Csb microsomes at 37 C (10 min) with ethanol and 0.5 or 5.0 μg/ml glucose oxidase gave rise to ethanol oxidation rates that were 65% and 30%, resp., of corresponding values obtained with Csa microsomes. Clearly, inactivation of catalase in Csb microsomes during 37 C incubations causes a shift in the H_2O_2/catalase ratio to higher values, leading to a disproportionately larger contribution of the "catalatic" reaction and a greater inhibition of ethanol oxidation at 5.0 as opposed to 0.5 μg/ml glucose oxidase. In contrast, no differences in ethanol oxidation rates were observed between Csa and Csb microsomes incubated at 30 C (10 min), regardless of glucose oxidase concentration. These studies indicate strongly that hepatic MEOS activity can be accounted for by the concerted action of catalase (60-70%) and alcohol dehydrogenase (30-40%).

8081 METABOLISM OF ALCOHOL AT HIGH CONCENTRATIONS: ROLE AND BIOCHEMICAL NATURE OF THE HEPATIC MICROSOMAL ETHANOL OXIDIZING SYSTEM.

(Eng.) Teschke, R.; Matsuzaki, S.; Ohnishi, K.; Masumura, Y.; Lieber, C. S. (Veterans Admin. Hosp., Bronx, NY 10468). *Adv. Exp. Med. Biol.* 85A:257-280; 1977.

Studies concerning the role and biochemical nature of the hepatic microsomal ethanol oxidizing system (MEOS) are reviewed, and results of the authors' xperiments are presented. At intermediate nd higher alcohol concentrations, ethanol metabolism proceeds via alcohol dehydrogenase (ADH) nd MEOS, whereas catalase plays no significant role. Following prolonged ethanol consumption, n enhancement of both MEOS activity and the rates of ethanol metabolism occurs; the latter persists espite inhibition of ADH by pyrazole and catalase y sodium azide, suggesting that MEOS is involved n the adaptive increase. This conclusion was upported by the authors' experiments in which utanol had no inhibitory effect on *in vitro* oxiation of ethanol mediated by catalase in the presence of a H_2O_2-generating system. In liver lices, the pyrazole-insensitive ethanol oxidaion was decreased by 43.2% ($p<0.01$) in the presnce of butanol, a value similar to the correspondng result obtained in isolated microsomes for he inhibition of MEOS. These results suggest hat the MEOS is responsible for the pyrazole-nsensitive pathway. Other experiments in which minotriazole pretreatment failed to inhibit thanol metabolism provided strong evidence against a significant involvement of catalase in ethanol metabolism under physiological conditions in which no DL-alanine was added. MEOS exhibits characteristics similar to those of other microsomal drug metabolizing enzymes and can be differentiated and isolated from both ADH and catalase activities. Reconstitution of MEOS activity was achieved with partially purified cytochrome P-450 and NADPH-cytochrome c reductase in the presence of synthetic phospholipid. The results of the present studies and others in the literature have led to the acceptance of the previously proposed thesis that MEOS is responsible for a major part of the adaptive increase in ethanol metabolism following chronic ethanol consumption and that the microsomal system is a distinct mechanism capable of oxidizing various alcohols by a pathway not requiring catalase or ADH.

8082 ALCOHOL METABOLISM AT HIGH ALCOHOL CONCENTRATIONS.

(Eng.) Thieden, H. I. D; Quistorff, B.; Grunnet, N. (Dept. Biochemistry A, Panum Inst., Univ. Copenhagen, DK-2200 Copenhagen, Denmark). *Adv. Exp. Med. Biol.* 85A:247-255; 1977.

The incorporation rate of tritium from (R,S)ethanol-1-^{3}H, (R)ethanol-1-^{3}H, and (S)ethanol-1-^{3}H in lactate and β-hydroxybutyrate was investigated by gas-liquid chromatography to estimate the extent of participation of alcohol dehydrogenase in ethanol oxidation at high concentrations of ethanol and to determine the intracellular location of acetaldehyde oxidation. In rat hepatocyte cultures containing 3 mM pyruvate in which 65 mM (R,S)ethanol-1-^{3}H was used as substrate, the labeling rate of lactate declined with time. The rate declined with the decrease in pyruvate concentration in the incubation medium and the concomitant fall in lactate production. The tritium incorporation rate into lactate was decreased from 1.5 μmol/min/ml packed cells to 0.23 μmol/min/ml in the presence of 4-methylpyrazole. In these experiments, the alcohol dehydrogenase-mediated ethanol oxidation rate was 3.18 ± 0.19 μmol/min/g wet weight, indicating that less than 20% of the acetaldehyde is oxidized in the cytoplasm. Using (R)ethanol as substrate, a constant fraction of tritium was incorporated into lactate, indicating that this incorporation is proportional to the formation of ^{3}H-NADH in this compartment. Tritium incorporation into lactate from (R)ethanol did not decrease when the ethanol concentration was increased from 6 mM to 65 mM. Providing the same isotope effect is present at high and low ethanol concentrations, the latter result implies that no substrate inhibition of alcohol dehydrogenase activity occurs in liver cells. Alternatively, a shift in the isotope effect could occur at high ethanol concentrations.

8083 ETHANOL METABOLISM, OXYGEN AVAILABILITY AND ALCOHOL INDUCED LIVER DAMAGE.

(Eng.) Israel, Y.; Kalant, H.; Khanna, J. M.; Orrego, H.; Phillips, M. J.; Stewart, D. J. (Dept. Pharmacology, Univ. Toronto, Ontario M5S 1A8, Canada). *Adv. Exp. Med. Biol.* 85A:343-358; 1977.

Studies concerning ethanol metabolism, oxygen availability, and alcohol-induced liver injury are reviewed. The rates of ethanol oxidation in various species are linked to the rates of general metabolism, and more specifically that of O_2 utilization by the liver. After chronic ethanol administration, increased oxidation of ethanol is accompanied by increased total hepatic O_2 utilization, as studied in the whole animals, the perfused liver, and isolated liver slices. The correlation is particularly striking in the spontaneously hypertensive rat. The linkage of these two phenomena makes the livers of rats chronically consuming ethanol abnormally vulnerable to hypoxic damage. Exposure to a 5% oxygen atmosphere for 6 hr produced major elevations of SGOT and serum ornithine-carbamyl transferase activities and marked centrilobular necrosis in alcohol-treated animals but not in controls. The same differential susceptibility was found to acute anemia produced by bleeding. These data indicate that chronic ethanol administration increases the susceptibility of the liver to ischemic injury.

8084 METABOLISM OF 25-HYDROXYLATED BILE ALCOHOLS. (Eng.) Mosbach, E. H.; Salen, G.; Shefer, S. *In : Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 11-15; 1977.

Studies concerning 25-hydroxylated bile alcohol metabolism are reviewed. Patients with the sterol storage disease cerebrotendinous xanthomatosis (CTX) secrete 25-hydroxylated bile alcohols in bile and feces. Quantitatively, the predominant bile alcohols are 5β-cholestane-3α,7α,12α,25-tetrol, 5β-cholestane-3α,7α,12α,23β,25-pentol, and 5β-cholestane-3α,7α,12α,24α,25-pentol. CTX patients produce cholic acid from cholesterol mainly via the intermediate 5β-cholestane-3α,7α,12α,25-tetrol, while chenodeoxycholic acid is formed probably via 5β-cholestane-3α,7α,25-triol. Nevertheless, subjects with CTX have the capacity to transform a 26-hydroxylated bile alcohol, 5β-cholestane-3α,7α,26-triol into cholic acid and chenodeoxycholic acid. Experiments *in vitro* indicate that hepatic microsomal enzymes of CTX patients, rat, and man catalyze the hydroxylation of 5β-cholestane-3α,7α,12α,25-tetrol in the 24α and 24β position, in the presence of O_2 and NADPH. However, only 5β-cholestane-3α,7α,12α,24β,25-pentol is converted to cholic acid (plus acetone) by soluble hepatic enzymes. This transformation requires NAD and probably involves a 24-ketone as an intermediate.

8085 ACETALDEHYDE METABOLISM IN VIVO DURING ETHANOL OXIDATION. (Eng.) Eriksson, C. J. P. (Res. Lab. State Alcohol Monopoly, Box 350, SF-00101 Helsinki 10, Finland). *Adv. Exp. Med. Biol.* 85A:319-341; 1977.

Information concerning acetaldehyde (AcH) metaboli
during ethanol oxidation is reviewed. The liver
the primary site for the oxidation of ethanol-derived AcH in the rat. Only a small amount of the
total AcH formed in this organ escapes into the
rest of the body, but this amount increases with
increasing hepatic ethanol concentrations. The bu
of the hepatic AcH output is eliminated extrahepatically, thus drastically changing the AcH le
from that initially leaving the liver. Nevertheless, the extrahepatic blood AcH levels can be us
as relatively accurate indicators of the correspo
ing hepatic AcH levels, since they are highly correlated with them. Significant levels of brain A
occur only at very high arterial blood AcH concentrations.

8086 THE ACUTE EFFECTS OF ETHANOL ON LIVER
BRAIN TRYPTOPHAN METABOLISM. (Eng.)
Badawy, A. A. B.; Evans, M. (Witchurch Hosp., Ca
diff, CF4 7XB, Wales). *Adv. Exp. Med. Biol.* 85A
559-569; 1977.

The effects of acute ethanol administration on l
and brain tryptophan metabolism are reviewed. E
anol enhances the activity of rat liver tryptoph
pyrrolase by increasing the availability of circulating free tryptophan to the liver by catecholamine-mediated lipolysis followed by displac
ment of protein-bound serum tryptophan. The response of the mouse liver enzyme to ethanol is
strain-dependent; ethanol activates the enzyme i
CBA/CA but not in C57/BL mice. Ethanol exerts a
biphasic effect on the concentrations of rat bra
tryptophan, 5-hydroxytryptamine, and 5-hydroxyindole-3-yl-acetic acid. Both aspects of this b
phasic effect are associated with an altered ava
ability of circulating free tryptophan. The ini
tial enhancement by ethanol of brain tryptophan
metabolism may be due to the above mentioned lip
lytic mechanism, whereas the subsequent decrease
in brain indoles may be caused by the enhanced
tryptophan pyrrolase activity. Brain tryptophan
metabolism is decreased by ethanol in CBA/CA mic
whereas no such change is observed in C57/BL mic

8087 EFFECT OF THE COENZYMES UDP-Glc, CDP-C
SAM AND CoA-SH ON THE LIVERS OF RATS
TREATED WITH ETHANOL AND A HIGH-FAT DIET. (Fre.
Cascales, M.; Feijoo, B.; Cerdan, S.; Robles-Chi
lida, E. M.; Santos-Ruiz, A. (Universidad Complu
tense, Madrid, Spain). *Ann. Pharm. Fr.* 35(11/1
447-459; 1977.

The protective effect of the lipotropic substan
uridine-diphosphoglucose (UDP-Glc), S-adenosylm
ionine (SAM), cytidine-diphosphocholine (CDP-Ch
and coenzyme A (CoA-SH) against development of
liver in rats fed ethanol and a high-fat diet w
investigated. Rats were given either ethanol (
in the drinking water) and a diet composed of 4
vegetable fat or a normal diet without ethanol.
Half the rats on the high-fat diet with ethanol
injected i.p. daily with 30 mg/kg UDP-Glc, 1.5
kg CDP-Ch, 3 mg/kg SAM, and 0.1 mg/kg CoA-SH, w

s the other half (controls) were injected daily with
n identical volume of physiological saline solu-
ion. At the end of 3 months, the rats were killed,
nd their livers were weighed, examined histologi-
ally, and their content of oxidoreductive and urea
ycle enzymes determined. Differences in the ratio
f liver weight/body weight in treated and untreated
ats on the ethanol and high-fat diet were not
ignificant. Untreated rats on the ethanol and
igh-fat diet had fatty livers. Ultrastructural
tudy of the livers of rats on the high-fat with
thanol diet showed a marked decrease (from 46% to
%) in the number of hepatocytes with fatty vacuoles
n rats treated with lipotropic substances compared
ith the untreated rats; in the treated rats, fatty
epatocytes were found grouped around the blood
essels. Of the liver oxidoreductive enzymes whose
evels were significantly ($p<0.05$-0.001) reduced
lucose-6-phosphate dehydrogenase, 6-phosphogluco-
ate dehydrogenase [6PGDH], transaldolase, and
ocitrate dehydrogenase NADP) by the high fat and
hanol regime, only the 6PGDH level was significant-
($p<0.05$) restored by the protective treatment.
the urea cycle enzymes whose levels were signifi-
ntly ($p<0.05$-0.001) reduced (carbamyl-phosphate
nthetase [CPase], ornithine transcarbamylase, and
ginase) by the high-fat and ethanol diet, CPase
d arginase were significantly ($p<0.01$) restored by
eatment. Liver GOT and glutamate dehydrogenase
vels were decreased in rats on the high-fat and
hanol diet ($p<0.05$-0.001); however, administration
the lipotropic agents significantly ($p<0.05$) pre-
nted the decrease of GOT. The lipotropic agents
so appeared to prevent the accumulation of free
monia in the livers of rats on the high-fat and
anol diet.

88 THE EFFECT OF PURINE BASES AND NUCLEOTIDES ON ETHANOL-INDUCED FATTY LIVER SYNDROME.

g.) Auditore, J. V.; Crisona, F.; Patthey, H.;
intonwa, A. (Meharry Medical Coll., Nashville,
37208). *Arch. Int. Pharmacodyn.* 232(2):302-
; 1978.

capacity of the purine bases and their nucleo-
le derivatives to prevent chronic ethanol-induced
ty liver and depressed adenine nucleotide levels
investigated in female Sprague-Dawley rats.
mean liver triglyceride concentration in rats
a control diet (12.3 ± 1.1 mg/g wet weight
er) was significantly lower ($p<0.001$) than that
rats fed either a control liquid fat diet (23.9
.1 mg/g), a fat diet plus adenine as 0.1% of
t (20.1 ± 1.8 mg/g), a fat diet plus 0.1% ATP
.8 ± 2.0 mg/g), a fat diet plus 0.1% guanine
.0 ± 1.6 mg/g), a fat diet plus 0.1% GTP (24.0
.9 mg/g), a fat diet plus ethanol as 20% of
oric intake (72.0 ± 5.1 mg/g), a fat diet plus
anol with or without adenine (43.7 ± 6.2 mg/g),
at diet plus guanine plus ethanol (70.1 ± 4.8
g), a fat diet plus ATP plus ethanol (68.6 ±
mg/g), or a fat diet plus GTP plus ethanol
.1 ± 5.3 mg/g). The hepatic ATP levels were
nificantly lower in animals fed the fat diet
70 ± 0.06 μmol/g wet weight liver) than in those
the control diet (2.96 ± 0.08 μmol/g). Ethanol
ne depressed the hepatic ATP level more than 85% of normal, and the level in the animals fed the fat diet plus ethanol alone (1.48 ± 0.8 μmol/g) was significantly reduced compared with the levels in animals fed control diet, fat diet, fat diet plus adenine (2.80 ± 0.08 μmol/g), fat diet plus ATP (2.76 ± 0.05 μmol/g), fat diet plus guanine (2.67 ± 0.09 μmol/g), fat diet plus GTP (2.60 ± 0.10 μmol/g), or fat diet plus ethanol plus adenine (2.32 ± 0.12 μmol/g). The incorporation of adenine into the fat diet partially restored hepatic ATP levels, and a slight increase was observed with ATP in the diet, but these differences were not statistically significant. Guanine and GTP failed to restore normal ATP levels.

8089 STUDIES ON FATTY LIVER WITH ISOLATED HEPATOCYTES. I. THE ACTION OF COLCHICINE, PHALLOIDIN, CYTOCHALASIN B, AND CYCLOHEXIMIDE ON PROTEIN AND TRIGLYCERIDE SYNTHESIS AND SECRETION.

(Eng.) Gravela, E.; Poli, G.; Albano, E.; Dianzani, M. U. (Istituto di Patologia Generale, Corso Raffaello 30, 10125 Torino, Italy). *Exp. Mol. Pathol.* 27(3):339-352; 1977.

The effects of colchicine, phalloidin, cytochalasin B, and cycloheximide on protein and triglyceride synthesis and secretion were studied in isolated rat hepatocytes to investigate the role of derangement of contractile protein systems in the pathogenesis of fatty liver. Control cells and cells treated with 20 μM colchicine or cycloheximide were completely dissociated from each other and demonstrated intact cell membranes. Five minutes after the addition of 20 μM cytochalasin B, plasma membranes showed numerous bubbles and many hepatocytes formed clusters of 4-10 cells. Similar changes were seen with 20 μM phalloidin, but these occurred less rapidly (after about 60 min). Colchicine (10 μM) produced 35% inhibition of protein secretion after 60 min of incubation; after 90 and 120 min, it reached about 60-65% inhibition. Cycloheximide (0.7 μM) produced a 20% decrease in protein secretion after 30 min, and a 40% decrease was noted after 60 min; inhibitions after 90 and 120 min were 55% and 60%, resp. Phalloidin (20 μM) had no effect on protein secretion after 30 min but provoked 50-60% inhibition at 60-120 min. While cytochalasin B (20 μM) did not significantly inhibit protein secretion after 30 min, about 50% inhibition occurred after 60 min; inhibition decreased slightly thereafter. Colchicine (10 μM) inhibited lipoprotein triglyceride secretion by about 60% at 30 min. Cycloheximide (0.7 μM) had no effect at 30 min but inhibited triglyceride secretion by 40% after 60-120 min. Phalloidin (20 μM) inhibited triglyceride secretion by 35% after 30 min, by 50% after 60 and 90 min, and by 40% by 120 min. Cytochalasin B (20 μM) did not modify triglyceride secretion at any time. There was a good quantitative correspondence between the decrease in secreted triglyceride radioactivity and the increase in intracellular triglyceride radioactivity, indicating that colchicine, cycloheximide, and phalloidin produced *in vitro* liver steatosis. The substances studied did not significantly modify triglyceride synthesis. The results show that protein and lipoprotein secretion from isolated liver cells may be blocked in at least two ways: (a) by inhibition of protein synthesis and (b) by impairment of the microtubular system.

8090 D-GALACTOSAMINE INDUCED HEPATIC CIRRHOSIS: ITS ULTRASTRUCTURAL AND BIOCHEMICAL STUDIES IN RAT. (Eng.) Funatsu, K.; Ishii, H.; Shigeta, Y.; Morita, A.; Tsuchiya, M. (Sch. Medicine, Keio Univ., Shinjuku-ku, Tokyo 160, Japan). *Acta Hepatogastroenterol.* 25(2):97-104; 1978.

Ultrastructural and biochemical studies of the liver were carried out in female Wistar rats treated with D-galactosamine (GALN, 250 mg/kg, i.p.) for 7 months. Histological examination of liver specimens taken at the end of treatment showed cirrhotic changes in most animals. Ultrastructural study showed mitochondrial proliferation and crenation of the mitochondrial membranes, focal hypertrophy of the smooth endoplasmic reticulum, saccular dilatation of the rough endoplasmic reticulum, the absence of liposomes in dilated tubules of the smooth endoplasmic reticulum, and smooth scattered fat droplets in the cytoplasm. No large fat droplets were observed in the cytoplasm. The nucleolous was relatively well-preserved, contrasting with the fact that marked fragmentation or small spherical deformities of the nucleoli are characteristic of GALN-induced liver injury. Proliferation of collagen fibers was present around the hepatocytes, and ruthenium red-positive material was found in the spaces of Disse and in part of the sinusoids. Liver weight increased significantly ($p<0.01$) after GALN treatment. However, the total lipid, triglyceride, and phospholipid concentrations were not affected by the treatment. There was a significant decrease in microsomal protein concentration after treatment ($p<0.005$) and an increase in the cytochrome P450 content ($p<0.05$). The plasma albumin concentration was significantly decreased after treatment ($p<0.01$), and the value of the zinc turbidity test was increased ($p<0.05$). There was no change in the SGPT level or in the total cholesterol concentration. Since there was no change in the contents of total hepatic lipids, triglycerides, proteins, or phospholipids, the increased liver weight after GALN treatment may be due to an increase in the amount of liver collagen fibers. It is unlikely that chronic GALN administration produces smooth endoplasmic reticulum hypertrophy in the rat liver, since there was no significant change in the microsomal phospholipid concentration and since the microsomal protein content was decreased.

8091 MECHANISM OF PALMITYL COENZYME A INHIBITION OF LIVER GLYCOGEN SYNTHASE. (Eng.) Wititsuwannakul, D.; Kim, K. H. (Dept. Biochemistry, Purdue Univ., West Lafayette, IN 47907). *J. Biol. Chem.* 252(21):7812-7817; 1977.

8092 RAT LIVER GLUCOSE-6-P DEHYDROGENASE: DIETARY REGULATION OF THE RATE OF SYNTHESIS. (Eng.) Winberry, L.; Holten, D. (C. H. Best Inst., 112 College St., Univ. Toronto Toronto, Ontario M56 1L6, Canada). *J. Biol. Chem* 252(21):7796-7801; 1977.

8093 PURINE METABOLISM IN ISOLATED RAT HEPATOCYTES. (Eng.) Smith, C. M.; Rovamo, L. M.; Kekomaki, M. P.; Raivio, K. O. (Children's Hosp., SF-00290 Helsinki 29, Finland) *Can. J. Biochem.* 55(11):1134-1139; 1977.

8094 INTERRELATION OF AEROBIC GLYCOLYSIS AND LIPOGENESIS IN ISOLATED PERFUSED LIVER WELL-FED RATS. (Eng.) Walli, R. A. (Institut fu Biochemie I der Universitat Heidelberg, Im Neuenheimer Feld 328, 69 Heidelberg, W. Germany). *Biochim. Biophys. Acta* 539(1):62-80; 1978.

8095 BILE SALT METABOLISM. I. THE PHYSIOLO OF BILE SALTS. (Eng.) Cowen, A. E.; Campbell, C. B. (Royal Brisbane Hosp., Brisbane, Queensland, Australia). *Aust. N.Z. J. Med.* 7(6); 579-586; 1977.

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8100 Entamoeba histolytica AND Entamoeba in dens: CHROMIUM RELEASE FROM LABELED HUMAN LIVER CELLS IN CULTURE. (Eng.) McCaul, F.; Poston, R. N.; Bird, R. G. (Natl. Inst. Heal Rocky Mountain Lab., Hamilton, MN 59840). *Exp. Parasitol.* 43(2):342-352; 1977.

8101 CANINE AND HUMAN LIVER PRESERVATION F 6 TO 18 HR BY COLD INFUSION. (Eng.)

Benichou, J.; Halgrimson, C. G.; Weil, R., III; Koep, L. J.; Starzl, T. E. (Denver Veterans Admin. Hosp., Denver, CO). *Transplantation* 24(6):407-411; 1977.

8102 REPEATED ARTERIAL EMBOLIZATION OF RAT LIVERS BY DEGRADABLE MICROSPHERES. (Eng.) Lindell, B.; Aronsen, K. F.; Rothman, U. (Malmo General Hosp., Malmo, Sweden). *Eur. Surg. Res.* 9(5):347-356; 1977.

8103 LIVER PATHOLOGY IN YOUNG RATS FED A NATURAL LYSINE-IMBALANCED DIET. (Eng.) de Parada, N. M.; Garcia de Davila, M. T.; Rio, M. E.; Koch, O. R. (Facultad de Farmacia y Bioquimica, Universidad de Buenos Aires, Junin 956, 1113 Buenos Aires, Argentina). *Nutr. Rep. Int.* 17(2):197-207; 1978.

3104 AN IN VIVO INVESTIGATION OF THE NEGATIVE CHRONOTROPIC EFFECT OF CHOLIC ACID IN THE RAT. (Eng.) Joubert, P. (Dept. Pharmacology, Jniv. Orange Free State, P.O. Box 339, Bloemfontein, 9300, South Africa). *Clin. Exp. Pharmacol. Physiol.* 5(1):1-8; 1978.

3105 MICRODENSITOMETRIC AND AUTORADIOGRAPHIC COMPARISON OF THE DNA CONTENTS OF FOETAL AND ADULT RAT LIVER NUCLEI. (Eng.) Bedi, K. S.; Goldstein, D. J. (Medical Sch., Stopford Building, Jniv. Manchester, Manchester, England). *Histochemistry* 55(1):63-74; 1978.

106 COBALT-ACTIVATED ACYLASE ACTIVITY IN EXPERIMENTAL TOXIC LIVER DAMAGE. (Eng.) ledzinski, Z.; Kokot, F. (Silesian Medical Acad., 0-027 Katowice, Poland). *Arch. Immunol. Ther. xp.* 25(4):601-610; 1977.

107 EFFECT OF IRRADIATION ON THE ERYTHROCYTE MEMBRANES OF HOMOZYGOUS GUNN RAT SUCKINGS. (Eng.) Sato, H.; Katoh-Semba, R.; Kashiwaata, S. (Inst. Developmental Res., Aichi Prefecural Colony, Kamiya-cho, Kasugai, Aichi 480-03, apan). *Biol. Neonate* 32(3/4):158-165; 1977.

8108 PATHOGENESIS AND ROLE OF MICROTUBULAR ALTERATIONS IN ALCOHOL INDUCED LIVER INJURY [Abstract]. (Eng.) Matsuda, Y.; Baraona, E.; Salaspuro, M.; Lieber, C. S. (Bronx Veterans Admin. Hosp., Bronx, NY). *Fed. Proc.* 37(3):402; 1978.

8109 INHIBITION OF DIETHYLNITROSAMINE (DEN) INDUCED ACUTE LIVER CELL NECROSIS BY DIETHYLDITHIOCARBAMATE (DEDTC): A POSSIBLE SITE OF ACTION AFTER THE ACTIVATION STEP [Abstract]. (Eng.) Ying, T. S.; Sarma, D. S. R.; Farber, E. (Dept. Pathology, Univ. Toronto, Toronto, Ontario, Canada). *Fed. Proc.* 37(3):402; 1978.

8110 CHOLERETIC POTENCY OF GASTRIN I (GI) AND GASTRIN II (GII) [Abstract]. (Eng.) Deshpande, Y. G.; Kaminski, D. L. (Dept. Surgery, Saint Louis Univ., St. Louis, MO 63104). *Fed. Proc.* 37(3):697; 1978.

8111 CHARACTERISTICS OF THE HEPATIC TRANSPORT OF THE FOLATE ANALOG, AMETHOPTERIN [Abstract]. (Eng.) Strum, W. B.; Liem, H. H.; Muller-Eberhard, U. (Scripps Clinic, La Jolla, CA). *Clin. Res.* 26(2):113A; 1978.

8112 STUDIES OF BILE SALT TRANSPORT: EFFECT OF CYCLOHEXIMIDE ON HEPATIC BILE SALT TRANSPORT AND BINDING [Abstract]. (Eng.) Gonzalez, M. C.; Sutherland, E.; Simon, F. R. (Univ. Colorado Medical Center, Denver, CO). *Clin Res.* 26(2): 110A; 1978.

8113 SEX DIFFERENCES IN HEPATIC SULFATION OF TAUROLITHOCHOLATE [Abstract]. (Eng.) Hammerman, K.; Chen, L.; Fernandez, A.; Earnest, D. (Dept. Medicine, Univ. California, San Francisco, CA). *Clin. Res.* 26(2):110A; 1978.

See also, 7982, 7985, 7997, 7998, 8038, 8047, 8061, 8139, 8244, 8439, 8440, 8441, 8442, 8444, 8470, 8516, 8526, 8534, 8558.

SECRETION AND METABOLISM

Intestine

114 USE OF THE CONSTANT PERFUSION TECHNIQUE IN THE NONSTEADY STATE. (Eng.) Levitt, . D.; Bond, J. (Section Gastroenterology, Box 346 ayo, Univ. Minnesota, Minneapolis, MN 55455). *astroenterology* 73(6):1450-1453; 1977.

e source and magnitude of errors that may occur in measurements during nonsteady-state perfusion (e.g., gallbladder or gastric emptying) are presented. Errors arise (1) when the aliquots taken from two compartments of unequal volume are pooled for analysis but were not proportional in size to their respective compartment volumes (the total volume of the two compartments is underestimated; the error is nearly 50% when one compartment exceeds the other by a factor of 5 in volume), (2) when aliquots aspirated intermittently at a constant rate from a compartment of inherently fluctuating volume are pooled for analysis (if the volume changes instantaneously by a factor of 5, there is the same error and magnitude as in [1] above), (3) when the error committed in (2) is exacerbated by measuring the infusate volume as well (the underestimation in [1] is increased to >80%), (4) when one fraction of the aspirate has a higher marker concentration than does the remainder of the aspirate due to variations in the flow rate of perfusate and the fractions are pooled for analysis (if the marker concentrations is overestimated, then the true flow rate will be underestimated and vice versa, the magnitude of the error depending on the fluctuation of the marker concentration in the system and the relation of the aspiration rate to the true flow rate), (5) if a higher concentration of solute exists during periods of high flow and samples from different flow periods are pooled for analysis (the concentration of the solute and, hence, its absorption or secretion flow rate, is underestimated to an even greater extent than is volume), and (6) if a lower concentration of solute is present during periods of high flow and the samples are pooled for analysis (the marker concentration is overestimated, but the underestimation of volume flow reduces the error in the calculated total solute flow rate). Under nonsteady-state conditions, analysis of repeated small aliquots of aspirate would provide some information on the magnitude of the error, although precise calculation is impossible unless the fraction of perfusate aspirated is known. When constant-rate aspiration introduces error into the measurement of the flow rates of solutes not in the perfusate, the fastest feasible infusion rate should provide the most accurate result; if infusion must be slow, short-interval aspiration will reduce error. Also, the maximum possible quantity of perfusate should be collected as opposed to aspiration at a fixed rate. Two situations where a correct estimate of solute flow may be obtained despite nonsteady conditions are (1) if the test solute enters and is absorbed into the test segment at a constant rate independent of volume flow and (2) if the marker concentration is constant but solute concentration fluctuates.

8115 CHRONIC ALCOHOL CONSUMPTION DOES NOT MODIFY CHOLECYSTOKININ BLOOD LEVELS ESTIMATED BY BIOASSAY IN THE DOG.

(Eng.) Planche, N. E.; Chau-Huu, T.; Lai, P. P.; Sarles, H. (Unite de Recherches de Pathologie Digestive, Inserm U-31, 46, chemin de la Gaye, F-13009, Marseilles, France). *Digestion* 16(1/2):194-198; 1977.

To examine the hypothesis that increased pancreatic protein secretion in chronic alcoholism is due to increased cholecystokinin (CCK) release, blood levels of CCK were measured by an *in vitro* rabbit gallbladder bioassay in two series of dogs: five that received 2 g/kg 45% ethanol/day for 12-18 months via a gastric cannula and five controls. There was no difference in CCK activity between the two groups, either in the fasting state, after intragastric administration of ethanol, or after intraduodenal administration of 20 ml oleic acid following the infusion of secretion (1 clinical U/kg/hr, i.v., for 1 hr). CCK release is not modified during the course of chronic alcohol intoxication in the dog, and, therefore, differences in CCK release do not play a part in increased pancreatic protein secreti in chronic alcoholic dogs.

8116 TRANSFER AND METABOLISM OF CITRATE, SUCCINATE, α-KETOGLUTARATE AND PYRUVATE BY HAMSTER SMALL INTESTINE.

(Eng.) Browne, J. L.; Sanford, P. A.; Smyth, D. H. (Middlewood Hosp., Sheffield, England). *Proc. R. Soc. Lond.* [*Biol.*] 200(1139):117-135; 1978.

The transfer of citrate, succinate, α-ketoglutarat and pyruvate was studied in everted sacs of hamste small intestine to determine specific transfer mechanisms for each of these. All four intermediates were rapidly removed from the mucosal fluid (14.0, 11.7, 8.9, and 9.2 μmol/hr for succinate, α-ketoglutarate, citrate, and pyruvate, resp.) and appeared in the serosal fluid in the presence of metabolites. Only in the case of citrate, where consistently high recoveries of the unchanged intermediate were obtained, was there chromatographic evidence for transfer against a concentration gradient. The inhibitory effects of several carboxylates, some of which are not intermediates of the citric acid cycle, were teste All the dicarboxylates tested (succinate, α-ketoglutarate, fumarate, oxaloacetate, glutarate, and malate, all at 7.5 mM), with the exception of the latter two, were potent inhibitors (by >70%) of citrate transfer. Tricarballylate and pyruvate (both 7.5 mM) also produced significant inhibitio (69% and 26%, resp.), but the inhibition produced by 7.5 mM *cis*-aconitate was insignificant. The dicarboxylates produced inhibitions of succinate transfer that were significant at the 5% level, although less than the inhibitions produced on citrate transfer (5-82%). The 5% inhibition seen with glutamate was the only insignificant inhibition. Citrate, tricarballylate, and pyruvate reduced transfer by 54%, 59%, and 36%, resp., all significant at the 5% level; the effect of *cis*-aconitate was again insignificant. A similar pattern of inhibition of α-ketoglutarate transfer was seen, in that the effects of the dicarboxylates were greatest while the effect of pyruvate was least. These results suggest that carboxylates compete at the luminal membrane for the mechanisms involved in citrate, succinate, and α-ketoglutarate transfer, and that the mechanism for the transfer of these intermediates is different from the pathway involved in pyruvate transfe The transfer processes for citrate and succinate were saturable, and more than one pathway may be involved in the transfer of succinate. Pyruvate showed little interaction with the other three intermediates. A saturable component of transfe was demonstrated, although diffusion contributed considerable proportion of the total transfer.

portance of a downhill sodium gradient for trans-
r of citrate, succinate, α-ketoglutarate, and
ruvate across the luminal membrane was estab-
shed. A number of carboxylates stimulated the
tential differences across the intestine, al-
ough this was different from the potential dif-
rence produced by sugars and amino acids.

17 INFLUENCE OF ANTIBIOTICS ON MICROBIAL
INTESTINAL TRANSFORMATION OF CHOLESTEROL
COPROSTANOL IN MAN. (Eng.) Midvedt, T.; Fred-
ichsen, P. (Kaptein W. Wilhelmsen og Frues Bak-
riologiske Institutt, Univ. Oslo, Oslo, Norway).
and. J. Gastroenterol. 12(6):669-672; 1977.

e fecal excretion of coprostanol was studied in
healthy volunteers receiving antibiotics to in-
stigate the role of intestinal bacteria in the
nversion of cholesterol to coprostanol. The
llowing antibiotics were used: doxycycline (4
ojects), oxitetracycline (3), ampicillin (3),
enoximethylpenicillin (3), clindamycin (3), neo-
cin sulfate (1), and bacitracin (2). Before
tibiotic administration, coprostanol excretion
r exceeded that of cholesterol in all but one
oject. Antibiotic administration reduced the
prostanol/cholesterol ratio to less than 1 in
cases except subjects treated with doxycycline
roughout a 3-week observation period. In sub-
cts that received phenoximethylpenicillin, the
io went below 1 the day after administration of
drug was discontinued in one of the three men
estigated, increasing to 3.0 and 6.9, resp.,
nd 2 weeks later. In subjects receiving clinda-
in, ampicillin, or tetracycline, no coprostanol
detected on the first day, and in two of them,
duction of coprostanol was absent even after 12
15 weeks, resp. These results show that four
six antibiotics tested have a marked influence
microbial intestinal cholesterol transformation
coprostanol. Further studies are required to
ermine whether an antibiotic-induced absence of
estinal coprostanol production may have an in-
ence on other aspects of cholesterol metabolism.

8 HORMONAL STIMULATION OF INTESTINAL BRUSH
BORDER ENZYMES RELEASE. (Eng.) Eloy, R.;
ltier, J. P.; Raul, F.; Mirhom, R.; Clendinnen,
Grenier, J. F. (Unit 61 INSERM, Surgical Res.
Biophysiopathology of the Intestine, Avenue
iere, F-67200 Strasbourg, France). *Res. Exp.*
. (Berl.) 172(2):109-121; 1978.

importance of intestinal brush border enzyme
ease in response to graded doses of glucagon,
tagastrin, and cerulein was studied in rats
er common bile duct and pancreatic duct ligation.
intraluminal release of sucrase, alkaline
sphatase, aminopeptidases, and enterokinase was
reased after the *in vivo* administration of any
of the hormones at doses ranging between 10 pg
2 μg, with some changes reaching significance
.005-0.05). *Ex vivo* perfusion with glucagon
g) significantly increased the activities of
ase ($p<0.005$), alkaline phosphatase ($p<0.01$),
aminopeptidase ($p<0.05$) above control values.

Ex vivo perfusion with 20 or 200 pg pentagastrin significantly elevated the activities of sucrase, alkaline phosphatase, and aminopeptidase above control levels ($p<0.005-0.05$ at various times). The *ex vivo* administration of cerulein (100 pg) significantly stimulated sucrase, alkaline phosphatase, and aminopeptidase activities ($p<0.005-0.05$). The results suggest that there is a direct hormonal stimulation of the intestinal mucosa. This effect might be mediated, at least in part, by cyclic AMP, since 2 mM dibutyryl cyclic AMP exerted a marked stimulatory effect on the intraluminal release of proteins, sucrase, and enterokinase; however, the enzyme pattern following this stimulation was different from that produced by the three hormones.

8119 FOLATE CONJUGASE: TWO SEPARATE ACTIVITIES IN HUMAN JEJUNUM. (Eng.) Reisenauer, A. M.; Krumdieck, C. L.; Halsted, C. H. (Dept. Internal Medicine, Univ. California, Davis, CA 95616). *Science* 198(4313):196-197; 1977.

Folate conjugase activity from jejunal segments obtained at surgery in obese patients undergoing jejuno-ileal bypass was assayed using cell fractionation and diethylaminoethyl (DEAE)-cellulose and gel chromatography. On the basis of pH optima, inhibition by *p*-hydroxymercuribenzoate (PHMB), and molecular weight, two separate jejunal mucosal folate conjugase activities were found. One enzyme activity, membrane-bound and concentrated in the brush border fraction, was found to have an approximate molecular weight of 91,000 daltons, a neutral pH optimum, and no apparent requirement for sulfhydryl groups in the active site, since it was not inhibited by PHMB. The second enzyme activity was soluble and intracellular, had an approximate molecular weight of 45,000 daltons, an acid pH optimum, and an apparent requirement for sulfhydryl groups, since it was completely inhibited by PHMB. Although certain characteristics of the brush border and supernatant folate conjugase activities may have been altered by detergent treatment, nevertheless, prior to Triton solubilization, the brush border and supernatant fractions obtained by centrifugation exhibited distinct differences with regard to pH optima and PHMB inhibition. Although precise localization was not attempted, it is probable that the intracellular activity represents previously described lysosomal folate conjugase. Folate conjugase in the brush border may accomplish the initial digestion of dietary pteroylpolyglutamates.

8120 TOPOGRAPHICAL STUDIES ON INTESTINAL MICROVILLOUS LEUCINE β-NAPHTHYLAMIDASE ON THE OUTER MEMBRANE SURFACE. (Eng.) Takesue, Y.; Nishi, Y. (Res. Inst. Environmental Medicine, Nagoya Univ., Nagoya, Aichi 464, Japan). *J. Membr. Biol.* 39(4): 285-296; 1978.

The distance that the leucine β-naphthylamidase (LNAase) protrudes from the outer surface of the microvillous membrane was investigated in the rabbit small intestine, using an immunological technique combined with electron microscopy. Microvillous vesicles were incubated with various amounts of preparations of IgG against LNAase (anti L IgG) at 37 C for 60 min and then at 4 C for 20 hr or for 3 days. Vesicle agglutination was then determined by LNAase or sucrase assay methods. At the same time, inhibition of LNAase activity by anti-L IgG was measured. Microvillous vesicles with an LNAase:sucrase (L:S) ratio of 1.62 were quantitatively agglutinated by anti-L IgG during 20-hr incubation at 4 C, but vesicle agglutination did not occur in microvillous vesicles with an L:S ratio of 0.32, even after 3 days. LNAase inhibition by anti-L IgG was inhibited to a similar degree in both microvillous preparations. The extent of agglutination and inhibition attained by 15 μl of anti-L IgG per unit of LNAase after 20-hr incubation at 4 C were plotted against the L:S ratios of the vesicle preparations. About 90% or more agglutination was observed with vesicles having an L:S ratio higher than 1.4. Agglutination decreased hyperbolically when the L:S ratio was below this value. LNAase inhibition by anti-L IgG was independent of the L:S ratio and was about 65% over the range of L:S ratios examined. In contrast to anti-L IgG, IgG against sucrase-isomaltase complex (anti-SI IgG) quantitatively agglutinated vesicles with a high L:S ratio of 2.26, i.e., rich in LNAase and deficient in sucrase-isomaltase complex, as well as those with a low L:S ratio (0.32). Microvillous vesicles with an L:S ratio of 1.0 were seen ultrastructurally to be closed by the trilaminar membrane with a smooth surface. When these vesicles were incubated with anti-L IgG, continuous or bunch-like structures, appeared on the outer membrane; these protruded 16 nm from the surface. Negative staining showed a 15-nm wide particulate layer on the edge of untreated vesicles; this layer was not broadened by treatment with anti-L IgG. A comparison of these results with previous results in which vesicles were treated with anti-SI IgG has led the authors to conclude that LNAase, or at least its antigenic sites, protrudes about 10 nm from the outer surface of the microvillous membrane.

8121 DISACCHARIDASE AND LYSOSOMAL ENZYME ACTIVITIES IN AMNIOTIC FLUID, INTESTINAL MUCOSA AND MECONIUM: CORRELATION BETWEEN MORPHOLOGY AND DISACCHARIDASE ACTIVITIES IN HUMAN FETAL SMALL INTESTINE.

(Eng.) Antonowicz, I.; Milunsky, A.; Lebenthal, E.; Schwachman, H. (Harvard Medical Sch., Boston, MA). *Biol. Neonate* 32(5/6):280-289; 1977.

The relation of sucrase, maltase, and lysosomal enzyme activities to gestational age was investigated in amniotic fluid specimens obtained from 126 women between 14 and 28 weeks of pregnancy. In addition, the morphological development of intestinal mucosa was correlated with sucrase and maltase activities during gestation and the distribution of the brush border membrane-bound and lysosomal enzyme activities in amniotic fluid, intestinal mucosa, and meconium was analyzed in human fetal intestinal mucosa and meconium. Sucrase and maltase activity, which had a relatively constant level between the 14th and 18th weeks, showed a declining pattern
thereafter, reaching a very low level at the
26th week of gestation. No lactase activity
could be detected between 14 and 26 weeks of
gestation. The lysosomal enzymes, α-glucosi-
dase and β-D-fucosidase, showed patterns simi-
lar to the activities of sucrase and maltase.
No marked changes in *N*-acetyl-β-glucosaminidase
activity were noted between weeks 14 and 23. Be
tween the 11th and 20th weeks, the primitive vil
seen in sections of small intestine achieved mor
uniform shape and the crypts became deeper. The
activities of intestinal sucrase and maltase at
the 10th week were relatively low. Starting wit
12th week, these activities increased, and remai
approximately the same until the 26th week. At
term, the mucosa was completely mature, and the
villus to crypt ratio was about 6 to 1; the acti
ties of maltase and sucrase at this time reached
the values found in babies <1 yr of age. The ra
of the activities of sucrase and maltase in in-
testinal mucosa to that in amniotic fluid was re
tively constant between the 14th and 18th weeks,
being between 5 and 8 times higher in intestinal
mucosa than in amniotic fluid. After the 18th
week, disaccharidase activities decreased to a
very low value in amniotic fluid, while in the
intestinal mucosa they remained approximately at
the same level. The highest dissacharidase leve
were found in fetal meconium from two fetuses 17
and 18 weeks old. The ratio of α-glucosidase in
amniotic fluid to intestinal mucosa differed fr
that of sucrase and maltase being approximately
The distribution of β-D-fucosidase activity dif-
fered considerably from that of α-glucosidase at
17 and 18 weeks. The differences in distributi
of the disaccharidases and lysosomal α-glucosid
in amniotic fluid and intestinal mucosa suggest
that these enzymes originate in diverse fetal t
sues.

8122 EFFECT OF LACTOSE FEEDING ON CELL REN
DISACCHARIDASE ACTIVITY AND CALCIUM-B
ING PROTEIN CONTENT IN THE INTESTINAL MUCOSA OF
RATS.

(Eng.) Pansu, D.; Bellaton, C.; Bosshar
A. (Hopital Edouard Herriot, 69374 Lyon Cedex 2
France). *Ann. Biol. Anim. Biochim. Biophys.* 18
(1):127-132; 1978.

To determine how lactose increases the absorpti
and retention of calcium in the skeleton, intes
tinal mucosal structure and the levels of disac
idase activity, calcium binding protein (CaBP),
and calcium in the intestinal mucosa were studi
in male Wistar rats fed lactose (30% of diet)
from weaning. Rats were killed at the age of 4
months for enzymatic and autoradiographic studi
at 2, 3, 4, and 5 months for the CaBP assay, an
at 4 and 12 months for skeletal calcium measure
ment. Prolonged lactose feeding induced signif
icant cecal hypertrophy without mucosal hyperpl
The cecal weight increased, but mucosal weight
DNA content were similar in the lactose-fed an
control rats. Labeling and mitotic indices we
also unaltered. The specific activity of inve
tase was significantly higher in the duodenum
(36.1 ± 2.33 mU/mg protein) and cecum (0.46 ±
mU/mg) of lactose-fed rats than in control rat

3.9 and 0.23 ± 0.1 mU/mg, resp., $p<0.05$). The 3P content decreased with age in the duodenum controls; it was present in the jejunum and eum (20.40 and 5.0 nmol calcium bound/mg protein, sp.) at 2 months of age but disappeared at 3 nths. When a diet containing lactose plus vita- D (50 IU/100 g) was given, CaBP content de- eased at all levels of the intestine and disap- red from the duodenum when the rats were 5 nths old. The total body calcium content in onth-old lactose-fed rats was similar to that controls. However, the calcium content was kedly higher (1.23 mg/100 g) in 12-month-old, tose-fed rats than in controls (1.0 g/100 g). tose administration caused no changes in the ll intestine that could explain the increased orption and retention of calcium. The decrease CaBP content indicates that lactose increases orption by a mechanism that is not related to ive vitamin-dependent transfer.

3 STUDIES ON THE MEDIATION OF THE ATROPINE-RESISTANT RESPONSE TO NEUROSTIMULATION OF GUINEA-PIG DISTAL COLON [Abstract]. (Eng.) lesom, C. C.; Zeitlin, L. J. (Dept. Physiology, v. Strathclyde, Glasgow G1 1XW, Scotland). *J. siol. (Lond.)* 275:68P-69P; 1978.

4 INCORPORATION OF 14 ^{14}C-ERUCIC ACID INTO THE INTESTINAL MUCOSA OF MAN AND RAT [Ab- act]. (Eng.) Sueur, R.; Cerf, M.; Di Costanzo, Debray, C. (Hopital Bichat, 170, Bld. Ney, 77 Paris, Cedex 18, France). *Digestion* 16(1/2): ; 1977.

5 MICROVISCOSITY OF INTESTINAL CELL SURFACES DURING POSTNATAL DEVELOPMENT [Ab- act]. (Eng.) Whitney, J. O.; Hirschberger, Thaler, M. M. (Dept. Pediatrics, Univ. Califor- , San Francisco, CA). *Clin. Res.* 26(2):174A; 8.

8126 THE INFLUENCE OF RAT AGE ON CRYPT CELL KINETICS AFTER PARTIAL RESECTION OF THE SMALL INTESTINE. (Eng.) Kirchner, F. R.; Bybee, J. W.; Osborne, J. W. (Radiation Res. Lab., Univ. Iowa, Iowa City, IA 52242). *Proc. Soc. Exp. Biol. Med.* 157(4):572-575; 1978.

8127 FUNCTIONAL AND STRUCTURAL CHARACTERISTICS OF THE RAT INTESTINAL MUCOSA FOLLOWING ILEO-JEJUNAL TRANSPOSITION. (Eng.) Menge, H.; Robinson, J. W. L. (Medizinische Universitatsklinik, D-3550 Marburg/Lahn, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):150-154; 1978.

8128 INTESTINAL MUCINS IN HEALTH AND DISEASE. (Eng.) Forstner, J. F. (Hosp. Sick Children, 555 University Ave., Toronto, Ontario M5G 1X8, Canada). *Digestion* 17(3):234-263; 1978.

8129 HORMONE-SENSITIVE ADENYLATE CYCLASE IN HUMAN COLONIC MUCOSA. (Eng.) Simon, B.; Czygan, P.; Spaan, G.; Dittrich, J.; Kather, H. (Medizinische Klinik, D-6900 Heidelberg, W. Germany). *Digestion* 17(3):229-233; 1978.

See also, 7975, 7977, 7984, 7986, 7997, 8004, 8019, 8033, 8040, 8132, 8133, 8134, 8135, 8136, 8168, 8169, 8303, 8353.

GENERAL

0 MODELING THE GASTROINTESTINAL SYSTEM. (Eng.) Finkelstein, S. M.; Dreiling, A.; Blesser, W. B. (Mount Sinai Sch. Medicine, y Univ. New York, New York, NY). *Bull. N.Y. d. Med.* 54(3):251-260; 1978.

asic block diagram model was developed to de- ibe the overall operation of the gastrointes- al system and to study the interaction between various organs of the system during digestion. primary blocks of the system represent the mach, duodenum, pancreas, and gallbladder. Ex- ation signals for the system are the neural gus) responses to food intake and the volume ects of the constituents of food, particularly fat, carbohydrate, and protein. The initial study proposes that both the pH and the volume of the ingested foodstuff stimulate the primary system blocks. The model describes the acid and gastrin responses of the stomach wall, the duodenal hormonal response to the secretin concentration, and the gallbladder response to cholecystokinin in a total closed-loop configuration. Once the model has been validated and quantitative values have been assigned to the various blocks, the model can be simulated on a digital computer and then can be used to study the interactive effect of each subsystem on total system function and the sensitivity of the system's response to variations in parameters.

8131 INFLUENCE OF BODY POSITION, DRY AND WATER SWALLOWS, SMOKING, AND ALCOHOL ON ESOPHAGEAL ACID CLEARING. (Eng.) Kjellen, G.; Tibbling, L. (Univ. Hosp., Linkoping, Sweden). *Scand. J. Gastroenterol.* 13(3):283-288; 1978.

The usefulness of the acid-clearing test (ACT) was further evaluated in 21 normal subjects by investigating the effects of differing the body position, swallowing water, smoking, and drinking alcohol on the test results and reproducibility. The ACT was carried out according to a reported procedure, with some modifications. The pH-electrode, which was calibrated against buffer solutions of pH 4.0 and 7.0 before each subject was investigated, was placed 5 cm above the lower esophageal sphincter (LES). The electrode was connected to a pH-meter. Fifteen milliliters of 0.1 M HCl was instilled in the esophagus over 30 sec, with the catheter placed 15 cm above the LES. The subject swallowed dry every 30 sec, and the number of swallows to reach a pH of 5.0 were summed. There was a significant increase in the number of swallows required to reach pH 5.0 in the head down position ($p<0.003$), after smoking ($p<0.003$), and after drinking alcohol ($p<0.001$). The number of swallows required to reach pH 5.0 was significantly lower in subjects who swallowed 5 ml of water ($p<0.0005$) than in those who swallowed dry. Five hundred and twenty-five milliliters of saliva or 1,680 ml of water was used to raise the pH of a 15-ml solution of 0.1 M HCl to 5.0. If saliva production during 15 min was drawn off every 30 sec, which corresponds to the amount swallowed during the same period in a normal subject, and this amount was mixed with the 0.1 M HCl solution, no change in pH occurred. It is proposed that the outcome of the ACT reflects both the transporting capacity of the esophageal muscles and the production of saliva. The precision of this test is unsatisfactory for use in individual cases, but it seems well suited for the evaluation of esophageal acid clearing in larger samples.

8132 RADIOIMMUNOASSAY OF GASTROINTESTINAL HORMONES. (Eng.) Straus, E. (Veterans Admin. Hosp., 130 W. Kingsbridge Rd., Bronx, NY 10468). *Gastroenterology* 74(1):141-152; 1978.

8133 LUMINAL GASTRIN STIMULATES GROWTH OF DISTAL RAT INTESTINE [Abstract]. (Eng.) Johnson, L. R.; Ryan, G. P.; Copeland, E. M.; Dudrick, S. J. (Univ. Texas Medical Sch., Houston, TX 77025). *Fed. Proc.* 37(3):374; 1978.

8134 THE EFFECT OF RENAL ARTERY LIGATION ON SERUM GASTRIN CONCENTRATIONS IN RATS [Abstract]. (Eng.) Wilder, D. E.; Hohnke, L. A. (Pfizer General Res., Groton, CT 06340). *Fed. Proc.* 37(3):373; 1978.

8135 EFFECTS OF INTESTINAL INFUSION OF SOLUTIONS WITH DIFFERENT TONICITIES IN CONTROL AND STAPHYLOCOCCAL ENTEROTOXIN B (SEB)-EXPOSE RABBITS [Abstract]. (Eng.) Dufault, D. R.; Liu, C. T. (USA Medical Res. Inst. Infectious Diseases Fort Detrick, MD 21701). *Fed. Proc.* 37(3):697; 1978.

8136 MUCIN DEGRADATION IN THE BLIND LOOP SYNDROME [Abstract]. (Eng.) Prizont, R. (Albuquerque Veterans Admin. Hosp., Albuquerque, *Clin. Res.* 26(2):112; 1978.

8137 A STUDY OF THE EFFICACY OF TYPHOID VACC IN INDUCING HUMORAL AND CELL-MEDIATED IMMUNE RESPONSES IN HUMAN VOLUNTEERS. (Eng.) Nath, T. R.; Malaviya, A. N.; Kumar, R.; Balakris nan, K.; Singh, B. P. (All India Inst. Medical Sciences, New Delhi, 110016, India). *Clin. Exp. Immunol.* 30(1):38-43; 1977.

8138 MICROBIAL ECOLOGY OF THE GASTROINTESTIN TRACT. (Eng.) Savage, D. C. (Dept. Microbiology, Univ. Illinois, Urbana, IL 61801). *Annu. Rev. Microbiol.* 31:107-133; 1977.

8139 FURTHER EVIDENCE FOR THE EARLY EXPRESSI OF IMMUNITY TO *Fasciola hepatica* IN RAT (Eng.) Hayes, T. J. (Hoffmann-La Roche, Inc., N NJ 07110). *J. Parasitol.* 64(2):374-376; 1978.

See also, 7996, 8023, 8031, 8034, 8152.

DIAGNOSTIC PROCEDURES

CURRENT STATUS OF CARCINOEMBRYONIC ANTI-
GEN (CEA) AND CEA-S ASSAYS IN THE EVALU-
N OF NEOPLASMS OF THE GASTROINTESTINAL TRACT.

.) Nakamura, R. M.; Plow, E. F.; Edgington,
. (Scripps Clinic and Res. Foundation, La Jolla,
2037). *Ann. Clin. Lab. Med.* 8(1):4-10; 1978.

significance of carcinoembryonic antigen (CEA)
rmination in the diagnosis of gastrointestinal
lasms was compared with that of CEA-S (a homo-
ous isometric species of CEA) in 308 sera. In
tion, the properties of CEA and CEA-S and the
lts of several studies on CEA in the diagnosis
eoplasms are reviewed. The sedimentation ve-
ty for CEA is slightly higher than that for
S (6.8 versus 6.6). The isoelectric distri-
on of CEA is heterogeneous and extends from
than 3.0 to approximately 5.2 as compared with
homogeneous isoelectric point of approximately
for CEA-S. The amino acid composition of CEA
CEA-S is similar, except that CEA-S has a 10%
tive increase in lysine and a 5% decrease in
onine content. In the study of the 308 sera,
reshold of 5 ng/ml was used for the CEA assay,
a threshold of 14 U/ml was used for the CEA-S
y. Four percent of the 75 normal sera and
% of the sera from 44 patients with benign
onary diseases were positive for CEA, but none
positive for CEA-S. Similarly, the CEA test
positive in 9.8% of the sera from 92 patients
benign gastrointestinal disease and in 31.2%
e 48 patients with lung carcinoma, whereas
corresponding figures for the CEA-S assay were
nd 10.4%, resp. The CEA assay was positive
.7% of the 49 cases of gastrointestinal tu-
, whereas the CEA-S assay was positive in 46%.
e results suggest that the CEA-S assay results
ewer false-positive results and in more true-
tive results in gastrointestinal malignancies
does the conventional CEA assay.

ANGIOGRAPHIC DIAGNOSIS OF LEIOMYOMAS OF THE SMALL INTESTINE.

(Eng.) Han, S. Y.;
ete, J. S. (Univ. Alabama Sch. Medicine, 619 S.
St., Birmingham, AL 35233). *Am. J. Gastro-*
ol. 68(1):91-94; 1977.

ase of a 54-yr-old man with recurrent episodes
evere gastrointestinal bleeding over a 5-yr
d in whom small intestinal leiomyomas were
nstrated by visceral angiography is presented.
patient had experienced several episodes of
plained hematochezia. Endoscopy of the
hagus, stomach, and duodenum, and procto-
oidoscopy were unrevealing. Mesenteric arterio-
y demonstrated three vascular lesions in the
bowel. The largest measured 8 cm in diameter
was located in the distal ileum, and the other
were found in the proximal jejunum. The arter-
supplying these tumors were dilated and opaci-
earlier than the adjacent normal vessels.
e was also early visualization of effluent veins
appeared markedly dilated. At operation, mul-
e sessile and pedunculated tumors were found
ing from the muscular layers of the small intes-
. Most could be shelled out without resection of the small bowel. Removal of the large tumor required resection of the involved ileal segment. Histological examination of all tumors showed leiomyomas with cystic degeneration, hemorrhage, and infarct but without evidence of sarcomatous changes. The results in this patient and those reported in the literature suggest that leiomyomas of the small intestine may be detected by their peculiar characteristics on selective arteriography, and that this procedure may be useful in patients with massive hematochezia of unexplained origin.

8142 THE PERSISTENT LOOP SIGN IN NEONATAL NECROTIZING ENTEROCOLITIS: A NEW INDICATION FOR SURGICAL INTERVENTION?

(Eng.) Wexler, H. A. (2485 N.E. 202nd St., N. Miami Beach, FL 33180). *Radiology* 126(1):201-204; 1978.

Five patients who demonstrated a new radiographic sign in neonatal necrotizing enterocolitis are described. All patients demonstrated an unchanging dilated loop of small bowel, which was followed by perforation in three infants; the other two had surgical and/or autopsy corroboration of profound bowel wall necrosis. In the first child, early surgical intervention was not recommended because this was one of the first in which a "persistent loop" was recognized. Perforation occurred, and emergency laparotomy confirmed peritonitis with distal ileal and jejunal necrosis. Although the persistent loop syndrome was recognized in the second patient, her temporary clinical improvement delayed surgical intervention. By the time she was operated upon, she had advanced bowel necrosis, peritonitis, and ascites. In the third patient, it was not possible to resect all diseased bowel at laparotomy, and the unchanging bowel pattern in the first 3 postoperative days suggested that the remaining necrotic intestine was irreparably damaged. Since the clinical condition of the fourth child did not warrant an emergency laparotomy after an initial radiograph showed the persistent loop syndrome, one more radiograph was obtained; by this time, perforation had already occurred. The morbid condition of the fifth patient precluded surgical intervention at the time that the persistent loop was identified. Loculated free air in the right lower quadrant was noted on the next film. At autopsy, the perforation had closed over; however, as in the other cases, it was preceded by a persistent loop. These findings suggest that infants with a persistent loop be considered candidates for laparotomy.

8143 CHOLANGIOGRAPHIC ABNORMALITIES IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE.

(Eng.) Rohrmann, C. A., Jr.; Ansel, H. J.; Freeny, P. C.; Silverstein, F. E.; Protell, R. L.; Fenster, L. F.; *et al.* (Univ. Washington Sch. Medicine, Seattle, WA). *Radiology* 127(3):635-641; 1978.

An analysis of cholangiographic abnormalities present in 20 patients with inflammatory bowel disease (IBD) who underwent endoscopic retrograde cholangiography is presented. In all patients, abnormal liver function tests suggested major duct obstruction. The extent of involvement of both intra- and extrahepatic systems, branching characteristics, and caliber abnormalities manifested by mural irregularities, nodules, diverticula, stenoses, ectasias, and ductal obstructions or obliterations were evaluated by cholangiography. Intrahepatic system abnormalities were found in all patients. They included diminished arborization or pruning in 16 patients, stenosis and ectasia in 15 patients, and severe obliterative changes with duct obstruction in 4 patients. Extrahepatic duct abnormalities observed in 15 patients included mural irregularity, marked in some cases, diverticula, and stenoses. The cystic duct or cystic duct remnant was abnormal in six of eight patients who had previously undergone cholecystectomy. An extrahepatic ductal abnormality apparently found exclusively in IBD patients was a saccular outpouching of the lumen producing a diverticular appearance. The characteristic cholangiographic abnormalities demonstrated make differential diagnosis of biliary tract diseases possible. Endoscopic retrograde cholangiography is recommended to exclude extrahepatic obstruction, to establish a nonoperative diagnosis, and to assist in determining the method of treatment.

8144 STUDIES ON ALKALINE PHOSPHATASE ISOENZYMES IN HEPATIC DISEASES, RELATION TO γ-GLUTAMYLTRANSFERASE.

(Eng.) Burlina, A.; Bugiardini, R. (Centro Ospedaliero Borgo Trento, 37100 Verona, Italy). *Clin. Chim. Acta* 85(1):49-54; 1978.

Activities of the isoenzymes of alkaline phosphatase (ALP) and of total γ-glutamyltransferase (γGT) were determined in the sera of 164 patients with hepatic diseases. Total ALP activity was increased over that in 40 normal controls in 45% of the patients with acute viral hepatitis, in 42% of the patients with chronic active hepatitis, in 47% of those with liver cirrhosis, and in all patients with biliary obstruction. Of the 86 patients with increased total ALP levels, 37% showed a wider ALP_2 band (the fraction migrating with α_2-globulin), 44% showed an ALP_1 band (biliary band), and 18% showed the ALP_4 band (cirrhotic band). The ALP_1 band was present in all cases of biliary obstruction, in 9% of cases of acute viral hepatitis, in 8% of chronic hepatitis cases, and in 14% of cases of cirrhosis. In the patients with a wider ALP_2 band, the γGT levels were increased but always lower than 200 U/l. In the patients with the ALP_1 band, the γGT values were all high, and 64% of the patients had a level higher than 200 U/l. In the patients with an ALP_4 band, the values were all lower than 200 U/l. There was a significant correlation between the presence of the ALP_1 fraction and increased γGT values ($r=0.733$). It appears that alkaline phosphatase fractionation gives diagnostic information not obtainable from the determination of total ALP and γGT levels.

8145 PERCUTANEOUS BIOPSY OF THE LIVER AS A PROCEDURE FOR OUTPATIENTS.

(Eng.) Knauer, C. M. (Santa Clara Valley Medical Center, 751 S
Bascom Ave., San Jose, CA 95128). *Gastroentero*
74(1):101-102; 1978.

Experience with percutaneous liver biopsy as a
outpatient procedure in 107 patients during an
18-month period is presented. The Klatskin ne
with the suction technique of Menghini is used,
usually via the intercostal approach. The outpatient is allowed to leave 6 hr after the bio
and is instructed to avoid athletic activity a
heavy lifting for the next 24 hr. The outpati
ranged in age from 8 to 73 yr. Only one patie
had a complication; he bled from the biopsy si
within 1 hr of the procedure, requiring hospit
zation for blood transfusion and surgical cont
of the bleeding site. The minimal cost saved
patient was $153.00. Liver biopsy in outpatie
is both safe and economical.

8146 DIAGNOSIS OF HEPATOBILIARY DISEASE B
^{99m}Tc-HIDA CHOLESCINTIGRAPHY.

(Eng.
Rosenthall, L.; Shaffer, E. A.; Lisbona, R.; P
P. (Montreal General Hosp., 1650 Cedar Ave., M
treal, Quebec H3G 1A4, Canada). *Radiology* 126
467-474; 1978.

The use of ^{99m}technetium-labeled N-substituted
iminodiacetic acid derivative (Tc-HIDA) cholescintigraphy for the diagnosis of hepatobilia
disease was evaluated in 18 patients with acu
or chronic cholecystitis, 17 patients with hep
cellular disease, 16 patients with biliary tr
obstruction, and 19 controls with no evidence
hepatobiliary disease. In controls, images o
biliary ducts and gallbladder were obtained w
30 min after an i.v. injection of Tc-HIDA, wh
excretion from the intestinal tract was obser
less than 60 min after injection. None of the
tients with acute or chronic cholecystitis an
cystic duct obstruction demonstrated gallblad
filling. In chronic cholecystitis with a pat
cystic duct, the gallbladder was not visualiz
with Tc-HIDA scanning in 7 of 12 cases. This
ure was rectified in one patient by administe
cholecystokinin (CCK) followed by a second do
of Tc-HIDA. In seven patients who had surgic
bypass procedures, obstruction as the cause o
juandice was excluded because of gut activity
in 60 min, no unusual dilatation of the bilia
ducts beyond what is normally observed postop
tively, and a lack of prolonged retention of
activity in the biliary system. All five pat
with serum bilirubin levels exceeding 16 mg%
were studied on consecutive days with Tc-HIDA
then ^{131}I-labeled rose bengal showed higher l
to-background ratios with the latter agent; h
ever, no gut excretion was appreciated with e
radiopharmaceutical. Accurate visualization
the ductal system was possible with Tc-HIDA i
of 12 patients with hepatocellular disease in
the serum bilirubin was between 0.8 and 4.6 m
No ductal visualization occurred with serum b
rubin levels above 5 mg%. In eight patients
partial extrahepatic obstruction and hyperbil
rubinemia up to 5 mg%, a dilated biliary tree
detected by increased radioactivity, the dia

of the ducts, and delayed washout of the test agent into the duodenum. In summary, Tc-HIDA cholescintigraphy can identify patients with acute and chronic cholecystitis and all patients with a patent cystic duct following CCK administration. The value of Tc-HIDA over standard radiography in jaundiced patients is demonstrated by its simplicity in making a definitive differential diagnosis possible when the serum bilirubin levels are 5 mg% or less.

8147 VALUE OF THE MANDIBULAR RADIOGRAPH IN FAMILIAL POLYPOSIS COLI. (Eng.) Rabin, M. S.; Price, H. I. (Johannesburg Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 53(12):457-459; 1978.

8148 FIBEROPTIC PANSIGMOIDOSCOPY: AN EVALUATION OF ITS USE IN AN OFFICE PRACTICE. (Eng.) Manier, J. W. (Marshfield Medical Foundation, Inc., 510 North St. Joseph's Ave., Marshfield, WI 54449). *Gastrointest. Endosc.* 24(3):119-120; 1978.

8149 THE VALUE OF DIAGNOSTIC AIDS IN DETECTING PANCREAS CANCER. (Eng.) Fitzgerald, P. J.; Fortner, J. G.; Watson, R. C.; Schwartz, M. K.; Sherlock, P.; Benua, R. S.; *et al.* (Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY 10021). *Cancer* 41(3):868-879; 1978.

8150 ROUTINE OFFICE USE OF THE 60-CM FLEXIBLE FIBEROPTIC COLONOSCOPE. (Eng.) Carter, H. G. (Baylor Medical Plaza, 707 Barnett Tower, 3600 Gaston Ave., Dallas, TX 75246). *Dis. Colon Rectum* 21(2):101-103; 1978.

8151 PRELIMINARY ABDOMINAL FILMS IN ORAL CHOLECYSTOGRAPHY: ARE THEY NECESSARY? (Eng.) Harned, R. K.; LeVeen, R. F. (Univ. Nebraska Medical Center, 42nd and Dewey Ave., Omaha, NB 68105). *Am. J. Roentgenol.* 130(3):477-479; 1978.

8152 DISCRIMINATION OF HEPATOBILIARY DISEASES BY THE EVALUATION OF BROMSULFOPHTHALEIN BLOOD KINETICS. (Eng.) Molino, G.; Milanese, M.; Villa, A.; Cavanna, A.; Gaidano, G. P. (Istituto di Medicina Interna, Universita di Torino, Via Genova, 3, 10126 Torino, Italy). *J. Lab. Clin. Med.* 91(3):396-408; 1978.

8153 SALIVARY GLAND SCINTIGRAPHY: DIAGNOSTIC VERIFICATION OF PAROTID SALIVA FLOW THROUGH THE MAXILLARY SINUS AND NOSE. (Eng.) Karlsson, G.; Lind, M. (Karolinska sjukhuset, S-10401 Stockholm 60, Sweden). *Arch. Otorhinolaryngol.* 218(3/4):263-267; 1978.

8154 DIAGNOSIS OF PANCREATIC DISEASES. (Eng.) Lopez-Majano, V.; Bowie, J. (Cook County Hosp., 1825 W. Harrison St., Chicago, IL 60612). *Int. Surg.* 63(1):48-53; 1978.

8155 COMPARISON OF THE PRACTICAL DIAGNOSTIC VALUE OF DIFFERENT TOMOGRAPHIC MOVEMENTS. (Eng.) Lahde, S.; Vuoria, P. (Univ. Central Hosp., SF 90220 Oulu 22, Finland). *Roentgenblaetter* 30(12):636-641; 1977.

8156 OSMOTIC EFFECT AND SOLUBILITY OF AMIPAQUE (METRIZAMIDE) IN THE GASTROINTESTINAL TRACT. (Eng.) Johansen, J. G.; Kolmannskog, S. (Tromso Regional Hosp., 9012 Tromso, Norway). *Invest. Radiol.* 13(1):93-97; 1978.

8157 A DIAGNOSTIC APPROACH TO INFLAMMATORY DISEASE OF THE PANCREAS BY MEANS OF ENDOSCOPIC RETROGRADE CHOLANGIO-PANCREATOGRAPHY. (Eng.) Harada, H.; Tanaka, J.; Shundo, T.; Hayashi, T.; Sasaki, T.; Yamamoto, N.; *et al.* (Okayama Univ. Medical Sch., 5-1 Shikada-cho, 2-chome, Okayama 700, Japan). *Gastroenterol. Jpn.* 12(5):387-394; 1977.

8158 COMPLICATIONS OF ENDOSCOPIC PAPILLOTOMY [Abstract]. (Eng.) Tytgat, G. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):45; 1977.

8159 ENDOSCOPIC RETROGRADE CHOLANGIO-PANCREATOGRAPHY (ERCP): PRESENT POSITION AND PAPILLOTOMY. (Eng.) Siegel, J. H. (New York Medical Coll., Fifth Ave. at 106th St., New York, NY 10029). *N.Y. J. Med.* 78(4):583-591; 1978.

8160 ANGIOGRAPHY IN DETERMINING THE CAUSE AND TREATMENT OF GASTROINTESTINAL BLEEDING. (Eng.) Grace, D. M.; Gold, R. E. (Univ. Hosp., 339 Windermere Rd., London, Ontario N6A 5A5, Canada). *Can. J. Surg.* 21(2):171-174; 1978.

8161 JEJUNAL BIOPSY WITHOUT THE NEED FOR SCREENING. (Eng.) Holdstock, G. (Royal Victoria Hosp., Boscombe, Bournemouth, England). *Lancet* 1(8076):1236-1237; 1978.

8162 DIAGNOSIS OF GASTRO-OESOPHAGEAL REFLUX IN INFANTS AND CHILDREN BY METHYLENE-BLUE TEST. (Eng.) Girardi, G.; Fritis, E.; Vial, L.; Hevia, E.; Otero, M.; Larrain, A.; Pope, C. E., II (E. Gonzalez Cortes Hosp., Santiago, Chile). *Lancet* 1(8076):1236; 1978.

8163 ROENTGEN EXAMINATION OF THE SMALL BOWEL USING INTRALUMINAL CONTRAST MEDIA. (Eng.) Dodds, W. J.; Goldberg, H. I. (Milwaukee County Medical Complex, 8700 W. Wisconsin Ave., Milwaukee, WI 53226). *Am. J. Dig. Dis.* 23(6):550-552; 1978.

8164 COST OF CARRYING OUT CLINICAL DIAGNOSTIC TESTS. (Eng.) Barnard, D. J.; Bingle, J. P.; Garratt, C. J. (York District Hosp., York YO3 7HE, England). *Br. Med. J.* 1(6125):1463-1465; 1978.

8165 STUDIES ON THE CEA-LIKE SUBSTANCE IN GASTRIC JUICE. (Eng.) Kawaharada, M.; Fukuya, S.; Suzuki, T.; Sudo, M.; Akahonai, Y.; Yachi, A.; Wada, T. (Sapporo Medical Coll., S. 1, W. 16, Chuo-ku, Sapporo, 060 Japan). *Gastroenterol. Jpn.* 13(1):8-12; 1978.

8166 COLONIC ENDOSCOPY IN PERSPECTIVE. (Eng.) Talbott, T. M.; MacKeigan, J. M. (Michigan State Coll. Human Medicine, Grand Rapids, MI 49503). *Surg. Clin. North Am.* 58(3):459-468; 1978.

8167 CLINICAL VALUE OF GASTROINTESTINAL FIBER-OPTIC ENDOSCOPY. (Eng.) Groll, A. (Div. Gastroenterology, Queen's Univ., 102 Stuart St., Kingston, Ontario K7L 2V6, Canada). *Can. J. Surg.* 21(3):196-205; 1978.

8168 TESTS OF SMALL-INTESTINAL FUNCTION--DIGESTION, ABSORPTION, SECRETION. (Eng.) Russell, R. I.; Lee, F. D. (Royal Infirmary, Glasgow, Scotland). *Clin. Gastroenterol.* 7(2):277-315; 1978.

8169 INVESTIGATION OF THE GASTROINTESTINAL BACTERIAL FLORA. (Eng.) Borriello, P.; Hudson, M.; Hill, M. (Central Public Health Lab., London, England). *Clin. Gastroenterol.* 7(2):329-349; 1978.

8170 BREATH TESTS. (Eng.) Caspary, W. F. (Dept. Medicine, Univ. Gottingen, Gottingen, W. Germany). *Clin. Gastroenterol.* 7(2): 7(2):351-374; 1978.

8171 ENDOSCOPIC CYTOLOGY AND BIOPSY IN THE UPPER GASTROINTESTINAL TRACT. (Eng.) Hughes, H. E.; Lee, F. D.; Mackenzie, J. F. (Dept. Cytology, Univ. Glasgow, Glasgow, Scotland). *Clin. Gastroenterol.* 7(2):375-396; 1978.

8172 DOUBLE CONTRAST RADIOLOGY IN THE GASTRO-INTESTINAL TRACT. (Eng.) James, W. B. (Southern General Hosp., Glasgow, Scotland). *Clin. Gastroenterol.* 7(2):397-430; 1978.

8173 GASTROINTESTINAL ANGIOGRAPHY. (Eng.) Boijsen, E.; Tylen, U. (Univ. Hosp., Lund, Sweden). *Clin. Gastroenterol.* 7(2):431-452; 1978.

8174 VISUALIZATION OF THE LIVER, BILIARY TREE AND PANCREAS. PART I: RADIOLOGY. (Eng Nunnerley, H. B. (King's Coll. Hosp., London, England). *Clin. Gastroenterol.* 7(2):453-475; 1978.

8175 DIFFERENTIAL DIAGNOSIS OF UPPER GASTRO-INTESTINAL BLEEDING AND CANCER. (Eng.) Sherlock, P.; Winawer, S. J. (Memorial Sloan-Kettering Cancer Center, New York, NY). *CA* 28(1):7-16; 1978.

8176 BARIUM DUODENOGRAPHY AS AN ADJUNCT TO PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPH (Eng.) Jaques, P. F.; Bream, C. A. (Dept. Radiolo Univ. North Carolina, Chapel Hill, NC 27514). *Am. Roentgenol.* 130(4):693-696; 1978.

8177 ULTRASOUND IN THE INVESTIGATION OF GALL-BLADDER DISEASE. (Eng.) Kappelman, N. B.; Sanders, R. C. (Johns Hopkins Medical Inst., 601 N. Broadway, Baltimore, MD 21205). *JAMA* 239 (14):1426-1428; 1978.

See also, 8013, 8131, 8132, 8200, 8204, 8205, 821
8220, 8222, 8243, 8251, 8252, 8263, 826
8277, 8285, 8286, 8295, 8296, 8315, 832
8344, 8345, 8346, 8358, 8369, 8371, 837
8377, 8381, 8396, 8399, 8400, 8401, 840
8407, 8411, 8412, 8427, 8438, 8446, 844
8452, 8459, 8460, 8463, 8464, 8465, 846
8467, 8472, 8473, 8474, 8476, 8494, 851
8536, 8537, 8561, 8563, 8577, 8578, 859
8608.

GASTROINTESTINAL DISEASES

ESOPHAGUS

8178 RECURRENT BRONCHOPNEUMOPATHIES CAUSED BY GASTROESOPHAGEAL REFLUX IN THE CHILD. CLINICAL, RADIOLOGICAL, AND HISTOLOGICAL STUDY OF 36 CASES. (Fre.) Dutau, G.; Familiades, J.; Rochiccioli, P. (C.H.U. Rangueil, 31054 Toulouse Cedex, France). *Poumon Coeur* 33(6):351-359; 1977.

In the period January 1973-March 1977, 36 children (ages 3 months-15 yr) who had recurrent bronchitis associated with gastroesophageal reflux (GF) were studied. The bronchitis had to have occurred at least three times in 3 months, and it was often associated with a chronic cough. X-ray studies were performed with the patients in the orthostatic, procubitus, and decubitus dorsal position with Trendelenburg. Respiratory endoscopy was performed in 5 patients and esophageal endoscopy in 14. The x-ray studies did not show any pulmonary abnormalities in 22% of the children; uni- or bilateral paracardiac opacities were observed in 36%, diffuse opacities with tendency for retraction of the right upper lobe in 8%, parenchymal distention in 22%, obstructive emphysema in 5%, and bronchial inundation in 8%. Pulmonary lesions were observed in all five of the children who were examined endoscopically. The lesions observed were either localized with atelectasis, obstructive emphysema, or bronchiectasis or generalized with granulomatous reactions around food particles. The GF problems were caused by neonatal vomiting in 34%, actual vomiting in 56%, postural vomiting in 28%, and nocturnal respiratory distress associated with vomiting in 16%. It is concluded that older children often have respiratory signs of GF before gastrointestinal signs, and GF may be present for several months or years before diagnosis.

8179 SCLEROTHERAPY OF BLEEDING OESOPHAGEAL VARICES BY MEANS OF ENDOSCOPY. (Eng.) Paquet, K. J.; Oberhammer, E. (Dept. Surgery, Univ. Bonn, D-5300 Bonn-Venusberg, W. Germany). *Endoscopy* 10(1):7-12; 1978.

The treatment of hemorrhage from gastroesophageal varices by endoscopic sclerotherapy of the esophageal wall is reported in 640 patients treated over a period of 8 yr. Using a special rigid esophagoscope, which included an optical system, an aspirator, and a needle and syringe, a maximum of 1 ml of 1% Aethoxysclerol (total fluid volume not more than 50 ml) was injected into the esophageal epithelium adjacent to the varices (if sclerosing agents are partly or totally injected into the esophageal varices, hemorrhage from varices of the stomach will occur). After two to four injections adjacent to the varices during 1 week, the remission of the varices was documented endoscopically or radiographically. Patients required reevaluation at 4-6 month intervals. After two to three sessions of sclerotherapy, the interval of control could be extended up to 1 yr without new danger of hemorrhage. If hemorrhage recurred or if increasing size of the varicosities was observed, sclerotherapy was repeated. If liver function improved, a portasystemic shunt was performed. In 211 patients, the indication for sclerotherapy was uncontrollable hemorrhage; in 386 patients it was performed in the bleeding-free interval for either decompensated liver function, hepatic precoma, the absence of anastomosable portal vessels, or thrombosed shunts. The remaining 43 patients were treated because of impending hemorrhage and portal hypertension. The overall mortality rate was 14.5%, the main causes of death being liver coma (42/93 patients), uncontrollable hemorrhage (26/93), and mediastinitis and pyothorax (8/93). About 50% of the patients survived for periods of 1-8 yr. Most of the 65% still alive have experienced no further bleeding. It is concluded that sclerotherapy is the method of choice in the treatment of massive hemorrhage from esophageal varices. It is indicated in patients with decompensated liver function and whenever a shunt procedure is impossible or inadvisable.

8180 ULCERATIVE ESOPHAGITIS AND COLITIS IN A PEDIATRIC PATIENT WITH BEHCET'S SYNDROME: RESPONSE TO STEROID THERAPY. (Eng.) Lebwohl, O.; Forde, K. A.; Berdon, W. E.; Morrison, S.; Challop, R. (Columbia Univ. Coll. Physicians and Surgeons, 630 W. 168th St., New York, NY 10032). *Am. J. Gastroenterol.* 68(6):550-555; 1977.

The case of a patient with Behcet's syndrome who developed radiologic and endoscopic evidence of ulcerative esophagitis and colitis is presented. The patient had been noted since infancy to have recurrent painless oral ulcers. At 11 yr of age, she developed painful genital and perianal ulcers, and oral ulcers recurred. Her symptoms resolved with treatment, which included prednisolone. Six months later, she presented with diffuse abdominal pain and persistent oral ulcers. Stool guaiac tests were positive, but sigmoidoscopy and barium enema examinations were normal. The symptoms resolved, and the patient did well on varying doses of prednisone for over 2 yr. At this time, she developed frontal headaches, episodes of nausea and vomiting, photophobia, diplopia, and oral ulcers, all attributed to Behcet's syndrome with central nervous system involvement. The symptoms gradually resolved while she continued to take 10 mg of prednisone every other day. One year later, she developed epigastric pain, and an upper gastrointestinal series revealed a large posterolateral ulcer in the lower esophagus, felt to be an impending perforation. Stool hematest was intermittently positive, and a barium enema examination showed polypoid filling defects in the cecum and ascending colon. The patient's symptoms gradually improved after the prednisone dose was increased to 60 mg per day. A repeat esophagram demonstrated partial healing of the esophageal ulcer. Her abdominal symptoms recurred after tapering the steroid dose. Fiberoptic colonoscopy revealed a localized area of severe inflammatory bowel disease characterized by ulceration, shaggy fibrinous exudate, friable mucosa, mucosal pseudopolyps, and some narrowing of the lumen, all in the cecum and proximal colon. The patient's symptoms resolved after the steroid dose was again increased to 60 mg daily, and a repeat barium enema showed considerable improvement in the appearance of the cecum and ascending colon. Colitis and esophageal ulceration should be considered in patients with Behcet's syndrome who present with gastrointestinal symptoms.

8181 THE RADIOLOGICAL DIAGNOSIS OF PEPTIC ULCER OF THE ESOPHAGUS. (Ger.) Truber, E.; Treichel, J. (Klinikum Steglitz der Freien Universitat, Hindenburgdamm 30, 1000 Berlin A5, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):111-115; 1978.

Peptic esophageal ulcer was diagnosed radiologically in 14 patients. The radiological examination also demonstrated esophagogastric reflux in all 14, esophagitis in 10, axial hiatal hernia in 13, and stenosis in 2. The ulcer was located at the esophagogastric junction in 13 cases and 5 cm above the cardia in the other. Endoscopy confirmed the x-ray diagnosis in all 11 cases examined. Hypotonic esophagography is believed essential for the differentiation between benign and malignant ulcers.

8182 BIOTIN-RESPONSIVE PROPIONIC ACIDEMIA PRESENTING AS THE RUMINATION SYNDROME. (Eng.) Hillman, R. E.; Keating, J. P.; Williams, J. C. (St. Louis Children's Hosp., 500 S. Kingshighway Blvd., P.O. Box 14871, St. Louis, MO 63178). *J. Pediatr.* 92(3):439-441; 1978.

8183 HERPES SIMPLEX ULCERATIVE ESOPHAGITIS IN A HEALTHY SUBJECT. (Eng.) Depew, W. T.; Prentice, R. S. A.; Beck, I. T.; Blakeman, J. M.; DaCosta, L. R. (Dept. Gastroenterology, Univ. Southern California, Los Angeles, CA 90007). *Am. J. Gastroenterol.* 68(4):381-385; 1977.

8184 SQUAMOUS PAPILLOMA OF THE ESOPHAGUS. (Eng.) Dourdourekas, D.; Kaymakcalan, H.; Steigmann, F. (Cook County Hosp., 1835 W. Harrison St., Chicago, IL 60612). *Am. J. Gastroenterol.* 68(4):379-380; 1977.

8185 STUDIES ON EXOGENOUS AND ENDOGENOUS INTERACTION OF GASTRIN AND SECRETIN IN A CASE OF ACHALASIA. (Eng.) Sekiyama, N.; Kakumoto, Y.; Nakagawa, S.; Wada, T. (Sapporo Medical Coll., S-1, W-16, Chuoh-ku, Sapporo, 060 Japan). *Gastroenterol. Jpn.* 12(5):395-399; 1977.

8186 FOREIGN BODY IN THE OESOPHAGUS: REVIEW OF 2394 CASES. (Eng.) Nandi, P.; Ong, G. B. (Queen Mary Hosp., Hong Kong). *Br. J. Surg.* 65(1): 5-9; 1978.

8187 RATIONAL TREATMENT OF OESOPHAGITIS. (Eng.) de Carle, D. J. (St. George Hosp., Kogarah, New South Wales 2217, Australia). *Drugs* 15(3):231-234; 1978.

8188 A TRIPLE DUPLICATION OF THE ALIMENTARY TRACT. (Eng.) Sherman, N. J.; Morrow, D.; Asch, M. (Children's Hosp. of Los Angeles, Los Angeles, CA 90054). *J. Pediatr. Surg.* 13(2): 187-188; 1978.

8189 INTRAMURAL DIVERTICULOSIS OF THE ESOPHAGUS IN AN EIGHT-YEAR-OLD BOY. (Eng.) Braun, P.; Nussle, D.; Roy, C. C.; Cuendet, A. (Hopital Cantonal, CH-1211 Geneva 4, Switzerland). *Pediatr. Radiol.* 6(4):235-237; 1978.

8190 SQUAMOUS CELL PAPILLOMA OF THE ESOPHAGUS: REPORT OF A CASE AFTER PEPTIC ESOPHAGITIS AND REPEATED BOUGIENAGE WITH REVIEW OF THE LITERATURE. (Eng.) Parnell, S. A. C.; Peppercorn, M. A.; Antonioli, D. A.; Cohen, M. A.; Joffe, N. (Beth Israel Hosp., 330 Brookline Ave., Boston, MA 02215). *Gastroenterology* 74(5, Part 1):910-913; 1978.

8191 SURGICAL MANAGEMENT OF HIATAL HERNIA WITH ESOPHAGEAL REFLUX. (Eng.) Vansant, J. H. (Doctors' Clinic Center, Suite 105, 844 Kempsville Rd., Norfolk, VA 23502). *Am. Surg.* 44(4):179-195; 1978.

8192 THE MALLORY-WEISS SYNDROME: A PROSPECTIV STUDY IN 130 PATIENTS. (Eng.) Clain, J. E.; Novis, B. H.; Barbezat, G. O.; Bank, S. (Groote Schuur Hosp., Observatory, Cape Town 7925, South Africa). *S. Afr. Med. J.* 53(15):596-597; 1978.

8193 GRANULAR CELL TUMORS OF THE ESOPHAGUS. (Eng.) Gershwind, M. E.; Chiat, H.; Addei, K. A.; Ferraro, L. R. (Nassau Hosp., Mineola NY 11501). *Gastrointest. Radiol.* 2(4):327-330; 1978.

8194 ESOPHAGEAL STRICTURE SECONDARY TO CANDIDI SIS. (Eng.) Ott, D. J.; Gelfand, D. W. (North Carolina Baptist Hosp., 300 S. Hawthorne Rd. Winston-Salem, NC 27103). *Gastrointest. Radiol.* 2(4):323-325; 1978.

8195 TRAUMA TO THE ESOPHAGUS. (Eng.) Love, L Berkow, A. E. (Foster G. McGaw Hosp., 216 S. First Ave., Maywood, IL 60153). *Gastrointest. Radiol.* 2(4):305-321; 1978.

8196 MID ESOPHAGEAL STRICTURE. (Eng.) Musher D. R. (New York Univ. Sch. Medicine, New

York, NY). *Am. J. Gastroenterol.* 69(3, Part 1): 331-336; 1978.

8197 MALLORY-WEISS SYNDROME IN TWO CHILDREN. (Eng.) Lamiell, J. M.; Weyandt, T. B. (Tripler Army Medical Center, Honolulu, HI). *J. Pediatr.* 92(4):583-586; 1978.

See also, 8005, 8160, 8162, 8167, 8171, 8175, 8220, 8237, 8239, 8251, 8267, 8305, 8367, 8398, 8529, 8572, 8573, 8574.

STOMACH

8198 GASTRIC LESION AND PERNICIOUS ANEMIA: A FAMILY STUDY. (Eng.) Varis, K.; Stenman, U. H.; Lehtola, J.; Siurala, M. (Second Dept. Medicine, Univ. Helsinki, Helsinki, Finland). *Acta Hepatogastroenterol.* 25(1):62-67; 1978.

To investigate the genetic contribution in the deficient secretion of intrinsic factor (IF) that underlies pernicious anemia, 5 subjects with pernicious anemia, 17 of their first-degree relatives, 3 subjects with atrophic gastritis, and 9 of their first-degree relatives were studied gastroscopically, bioptically, functionally, and immunologically. The results showed similarities of morphology, function, and immunology of the stomach within each family studied. Relatives of subjects with pernicious anemia accumulated features generally seen in overt pernicious anemia: slight to severe atrophic gastritis with normal or slightly altered antral mucosa, achlorhydria, low secretion of IF, and high levels of serum gastrin and parietal call antibody. Two relatives actually had overt pernicious anemia as judged by IF secretion. It was possible to identify a subgroup of relatives with overt pernicious anemia or a high risk of pernicious anemia on the basis of elevated serum gastrin levels, achlorhydria, and low IF secretion. IF secretion below 500 U/hr was seen exclusively in association with IF antibodies in the gastric juice and advanced atrophy of the gastric body mucosa (except in one subject with a resection stomach); four of these nine subjects had overt pernicious anemia on the basis of decreased serum vitamin B_{12} levels. The family of a subject with atrophic gastritis showed high levels of parietal cell antibodies.

8199 EFFECT OF PROLONGED ADMINISTRATION OF ANTI-INFLAMMATORY AND ANALGESIC DRUGS ON GASTRIC MUCOSA. (Fre.) Pascal, J. P.; Tournut, J. J. (CHU Toulouse-Purpan, F 31052 Toulouse Cedex, France). *Gastroenterol. Clin. Biol.* 2(1):15-22; 1978.

A histological study of the gastric mucosa was undertaken in 43 patients who had been on anti-inflammatory and/or analgesic drugs for 1-30 yr because of various arthritis types (mainly rheumatoid arthritis). Principally, the drugs involved were ketoprofene, indomethacin, acetylsalycilic acid, corticoids, buprofen, and sodium diclofenate. A group of 25 patients hospitalized in the gastroenterological unit for functional disorders were studied for comparison. Esophagogastroduodenal endoscopy was performed on each patient, and 10 biopsies of the mucosa were taken along the gastric curvature. A repeat of the study was performed on 12 of the arthritis patients 5-8 months after interruption or decrease in dosage of their analgesic or anti-inflammatory medication. A single pathologist rated all the biopsies as superficial gastritis, superficial gastritis with atrophy, atrophy, intestinal metaplasia, or normal. Specimens rated as atrophic were three times more frequent in the group of patients on the anti-arthritic drugs. Distribution of gastric lesions was not different in the two groups of patients. Reexamination of the 12 patients who had stopped or decreased their medication showed a significant ($p<0.001$) decrease in the number of specimens rated as atrophic; the frequency of metaplasia had not changed in these patients. It is concluded that the drugs used by these patients cause atrophy of the gastric mucosa but not superficial gastritis or intestinal metaplasia.

8200 ^{67}Ga-CITRATE SCANNING IN GASTROINTESTINAL MALIGNANCIES. (Eng.) Douds, H. N.; Berens, S. V.; Long, R. F.; Caplan, G. E. (Memorial Medical Center, P.O. Box 23089, Savannah, GA 31403). *Clin. Nucl. Med.* 3(5):179-183; 1978.

The use of ^{67}Ga-citrate scanning in cases of gastrointestinal (GI) malignancy is reported in seven patients and surveyed in the literature to point out specific situations where gallium scanning may be diagnostic. Seven proven cases of GI malignancy in which initial ^{67}Ga scans were positive were collected. Cases 1 and 2 were adenocarcinomas of the stomach, case 3 was a mixed-cell histiocytic lymphoma involving the stomach and cervical nodes, case 4 was a gastric lymphoma, case 5 was a recurrent small bowel lymphoma at the ligament of Treitz, case 6 was a recurrent cecal adenocarcinoma, and case 7 was a recurrent rectal histiocytic lymphoma. GI x-ray studies were normal in cases 4, 5, and 6 and inconclusive in cases 1 and 2. In case 3, a positive GI series, showing thickening of gastric folds suspicious for lymphoma, was supported by the ^{67}Ga scan, with abnormal gastric uptake from the fundus to the mid-antrum. In the normal or inconclusive GI series, increased gallium uptake during the ^{67}Ga scan indicated the location of the malignancy. In case 7, the recurrent rectal lymphoma was confirmed with the scan, which further revealed the presence of extensive upper abdominal disease. The literature is generally pessimistic regarding the value of gallium scanning in suspected GI malignancies, the major objection being its obscuring activity in bowel content. The authors emphasize that meticulous bowel cleansing prior to scanning and repeat scans at 72 and 96 hr improve the diagnostic yield and make it possible to visualize the abnormal uptake within the bowel itself. Increased use of ^{67}Ga scanning is recommended as a simple, noninvasive study that has been particularly useful in support of radiographic contrast studies of suspected carcinomas, in detecting the recurrence of known malignancy, in defining the extent of primary and metastatic disease, and as a diagnostic tool for debilitated patients.

8201 RELATIONSHIP BETWEEN DIET AND CARCINOMA OF THE STOMACH, COLON, RECTUM, AND PANCREAS IN FRANCE. (Fre.) Meyer, F. (Hopital E.-Herriot, Pavillon H, F 69374 Lyon Cedex 2, France). *Gastroenterol. Clin. Biol.* 1(12):971-982; 1977.

Age-standardized mortality rates for the years 1968 and 1969 for cancer of the stomach, colon, rectum, and pancreas were compared with the average consumption of bread, potatoes, fresh vegetables, fresh fruits, beef, eggs, fish, cheese, butter, oil, sugar, wine, and beer in eight districts of France. Consumption of foods that supply the same nutrients (butter/oil, wine/beer) showed significant ($p \leq 0.05$) negative correlations as did consumption of the pairs potatoes/fruits, butter/fruits, and butter/wine. There was a significant ($p \leq 0.05$) positive correlation in the consumption of bread/sugar/eggs, of oil/wine/vegetables, and of potatoes/beer (except in the North), fruits/oil, and fruits/vegetables. Beef consumption was not significantly correlated with the mortality rates for any of the cancers; moreover, the correlation was negative in sign for stomach cancer mortality ($r=0.58$) and colon cancer mortality ($r=0.33$). Because the food consumption patterns and cancer mortality patterns of the North and the Mediterranean regions are atypical of those in the other six regions, the sign, absolute value, and level of significance of the correlations varied considerably when first one and then both of these regions were excluded from the analysis. The significant ($p \leq 0.05$) correlations for all eight regions were between stomach cancer mortality and fruit ($r=-0.66$) and oil ($r=-0.72$) consumption; colon cancer mortality and potato ($r=0.68$), fruit ($r=-0.83$), butter ($r=0.74$), and oil ($r=0.83$) consumption; rectal cancer mortality and potato ($r=0.82$), fruit ($r=-0.77$), oil ($r=-0.71$), and beer ($r=0.73$) consumption; and pancreatic cancer mortality and potato ($r=0.67$), wine ($r=0.69$), and beer ($r=0.73$) consumption. When the North was excluded from the analysis, the most important differences in the correlations were that potato consumption lost its positive significance in colon, rectal, and pancreatic cancer mortality due to large decreases in the absolute value of r, butter consumption reached significance ($p \leq 0.05$) in correlation with stomach cancer ($r=0.87$), wine consumption lost its negative significance in correlation with pancreatic cancer, and beer consumption decreased below positive significance in correlation with rectal and pancreatic cancer. When the Mediterranean region was also excluded from the analysis, the most important changes were that potato consumption was again significant ($p \leq 0.05$) in stomach cancer mortality ($r=0.86$), the fruit consumption correlation changed markedly in either absolute value or sign and became insignificant in relation to colon and rectal cancer mortality, butter consumption became significant ($p \leq 0.05$) in rectal cancer mortality ($r=0.90$), and oil consumption los its negative significance in colon cancer mortalit No testable hypothesis can yet be made from these data.

8202 BASIC EXPERIMENTS ON ORAL ADMINISTRATION OF 5-FLUOROURACIL EMULSION AS ADJUVANT CHEMOTHERAPY TO SURGICAL TREATMENT FOR GASTRIC CANCER. (Eng.) Watanabe, S.; Nakao, E.; Cho, K.; Nishioka, B.; Fujita, Y.; Takahashi, T.; *et al.* (Kyoto Prefectural Univ. Sch. Medicine, Kyoto, Japan). *Jpn. J. Surg.* 8(1):41-50; 1978.

The absorption and distribution of 5-fluorouracil (5-FU) into the blood and tissues of Donryu rats was investigated to evaluate the usefulness of 5-F as adjuvant chemotherapy. An emulsion or solution of 5-FU (100 mg/kg body weight) was administered p.o. to the rats, and the 5-FU level was measured in the blood, kidneys, liver, stomach, duodenum, a lymph nodes at intervals of 30 min, 1, 2, 4, 6, 8, 12, and 24 hr. To investigate the absorption of 5-FU in the stomach in detail, the experiments wer also performed on pylorus-ligated rats. The highest levels of 5-FU were found in the stomach and duodenum; the maximum concentration achieved by use of the emulsion was 1.5 times that after use of the solution. An appreciable concentration of 5-FU was maintained over a longer period of time by the emulsion. High levels of 5-FU were also detected in the lymph and lymph nodes. In the lymph the maximum concentration attained by the 5-FU emulsion was three times higher than the maximum c centration attained by the 5-FU solution, and in the lymph nodes, the emulsion maximum concentration was twice as high as the solution maximum. The higher concentration was maintained over the course of the experiment. In pylorus-ligated rats the 5-FU concentration in the mucosa of the stomach was 77.3 ± 38.7 μg/g following the 5-FU emulsi and 34.1 ± 17.3 μg/g following the solution. In the lymph nodes, the 5-FU concentration was 0.9 ± 0.31 μg/g for the emulsion and 0.4 ± 0.13 μg/g for the solution. The studies show that 5-FU can be absorbed directly from the mucous membrane of the stomach even when administered as an emulsion. An appreciable amount of 5-FU is transported to the lymph nodes by way of the lymphatic capillaries. The findings, in general, may be explained by the enhancement of drug adsorbility, permeability, and retentivity in the tissues of the gastrointestinal tract when it is administered in the form of an emulsion. It is concluded that the p.o. administration of 5-FU emulsion is an effective adjuvant to surgery for gastric cancer, particularly for lymph node metastasis.

8203 TRANSPYLORIC EXTENSION OF GASTRIC CARCINOMA. (Eng.) Menuck, L. (Palomar Hosp., Escondido, CA 92025). *Am. J. Dig. Dis.* 23(3): 269-274; 1978.

The barium studies of the upper gastrointestinal tract in 88 patients with gastric carcinoma were evaluated to document the frequency of gross pyloric extension and to correlate the radiographic appearance with the gross anatomical changes in the pylorus and duodenal bulb. Of the 88 cases of gastric carcinoma, 17 showed transpyloric extension of the tumor; the phenomenon was microscopic in 10 cases and gross in 7. In all of the latter seven patients, the roentgen examination showed a malignant lesion of the antrum and/or pylorus with an associated abnormality of the duodenal bulb. The duodenal abnormalities included a mass lesion, mucosal destruction, or bizarre thickened folds. In six of the seven cases, the transpyloric extension was appreciated preoperatively. Three of the seven cases were properly diagnosed radiographically. Three cases were incorrectly diagnosed as gastric lymphoma because the examiner considered the finding of transpyloric extension to favor lymphoma, even though the antral abnormality was more consistent with carcinoma. The seventh case was initially believed to represent chronic peptic ulcer disease with antral and duodenal changes; the patient initially refused endoscopy, but the lesion was correctly diagnosed at 6-month follow-up. Only 3/88 cases showed pyloric obstruction. The present study fails to support the frequent assumption that since gastric carcinoma arises from the mucosa, it will encroach on the pylorus and obstruct it before transpyloric extension takes place.

8204 THE NATURAL HISTORY OF THE DOUBLE PYLORUS. (Eng.) Hegedus, V.; Poulsen, P. E.; Reichardt, J. (Glostrup Univ. Hosp., Copenhagen, DK-2600 Glostrup, Denmark). *Radiology* 126(1):29-34; 1978.

The natural history of the development of a double pylorus was investigated by examining the subjective complaints, clinical and radiological findings, and endoscopic observations in 11 patients with prepyloric ulcers and a fistula. Seven patients had undergone upper gastrointestinal series prior to the discovery of a fistula, and the prepyloric ulcers in these patients were located on the lesser curvature in four cases and the major curvature in two. Symptoms prior to the discovery of the antroduodenal fistula included abdominal pain, postprandial pain, vomiting, and gastrointestinal bleeding. In seven cases, significant relief of discomfort was obtained simultaneously with the establishment of the gastroduodenal fistula, and all these patients became asymptomatic. The remaining four patients were of doubtful clinical significance. One of these patients experienced recurrence of symptoms despite surgery. The consequences of the development of the fistula were difficult to evaluate in the other three patients because medical treatment was given at the time the double pylorus was discovered. Six case reports of patients in whom symptoms resolved after the development of the fistula are presented. One of these was particularly interesting, as the ulcer on the greater curvature did not affect the pancreas but penetrated into the duodenum. These cases demonstrate that the double pylorus is the result of ulcer penetration and that this fistula can be a sign of spontaneous recovery from ulcerative disease.

8205 DYNAMIC SCINTIPHOTOGRAPHIC STUDY OF THE ANTRAL MUCOSA WITH ^{99m}Tc-PERTECHNETATE IN HYPERGASTRINEMIA CAUSED BY RETAINED ANTRUM. (Ita.) Sciarretta, G.; Cavicchi, L.; Turba, E.; Fini, A.; Malaguti, P.; Cacciari, C. (Ospedali di Bologna, Bologna, Italy). *Bull. Sci. Med.* 149(2): 85-90; 1977.

The diagnosis of retained antrum by gastrin level test results and scintiphotographic studies is reported with reference to two male patients. Both patients had undergone Billroth II gastric resections for duodenal ulcers 6 and 9 months previously. The suspected diagnosis of retained antrum was based upon the elevated basal levels of serum gastrin in both of these patients (140 and 100 pg/ml compared with a normal value 60 ± 15 pg/ml). The tests of gastrin response (using secretin, calcium, and a protein meal) excluded the diagnosis of gastrinoma and supported the suspicion of retained antrum. In one of the patients, an endoscopic biopsy of the duodenal stump demonstrated the presence of antral mucosa. The scintiphotographic study with ^{99m}Tc-pertechnetate clearly demonstrated the presence of an area of activity on the bottom of the duodenal stump in both patients. The patients underwent resection of the retained antrum; histological examination of the tissue confirmed the diagnosis and follow-up studies revealed that the basal gastrinemia markedly decreased (to 75 pg/ml and 55 pg/ml resp.). The use of scintiphotography in cases of suspected retained antrum is advocated by the authors because it is a simple technique that gives a clear, differential diagnosis in these patients.

8206 A PROSPECTIVE COMPARATIVE STUDY OF CLINICAL AND HISTOLOGICAL CHARACTERISTICS IN ICELANDIC AND DANISH PATIENTS WITH GASTRIC ULCER, DUODENAL ULCER, AND X-RAY NEGATIVE DYSPEPSIA: I. DESIGN AND CLINICAL FEATURES. (Eng.) Oddsson, E.; Binder, V.; Thorgeirsson, T.; Jonasson, T. A.; Gunnlaugsson, O.; Wulff, M.; *et al.* (St. Josefspitallin, Reykjavik, Iceland). *Scand. J. Gastroenterol.* 12(6):689-694; 1977.

8207 NEW METHOD OF GASTRIC RESECTION. (Eng.) Cho, S.; Cho, S. (Yokohama Univ. Sch. Medicine, Yokohama, Japan). *Abdom. Surg.* 19(5): 107-111; 1977.

8208 EMPHYSEMATOUS GASTRITIS AND GASTRIC PERFORATION: AN UNUSUAL MANIFESTATION OF ALKALINE CORROSIVE INGESTION. (Eng.) Bernardino, M. E.; Lawson, T. L. (George Washington Univ. Medical Center, 901 23rd St. N.W., Washington, DC 20037). *Gastrointest. Radiol.* 2(2):107-108; 1977.

8209 SERUM GASTRIN IN PATIENTS WITH VARIOUS TYPES OF CHRONIC GASTRITIS. (Eng.) Fung, W. P.; Salmon, J. A.; Karim, S. M. M.; Tye, C. Y.; Lee, S. K. (Royal Perth Hosp., Box X2213, G.P.O. Perth, Western Australia 6001, Australia). *Am. J. Gastroenterol.* 68(2):141-144; 1977.

8210 ALCOHOL ABSORPTION FOLLOWING JEJUNAL INTERPOSITION IN PATIENTS WITH PREVIOUS GASTRIC SURGERY. (Eng.) Mendoza, C. B., Jr.; Rahbar, A.; Easley, G. W. (Veterans Admin. Hosp., Clarksburg, WV). *Milit. Med.* 142(11):874-875; 1977.

8211 MODIFIED HEINEKE-MIKULICZ PYLOROPLASTY AS AN EFFECTIVE GASTRIC DRAINAGE PROCEDURE. (Eng.) Seito, T.; Ogata, T. (Okayama Univ. Medical Sch., Okayama, Japan). *Jpn. J. Surg.* 7(3):165-169; 1977.

8212 UNUSUAL CAUSE OF GASTRIC BLEEDING: CRONKHITE-CANADA POLYPOSIS. (Eng.) Armengol-Miro, J. R.; Pedreira, J. D.; Guardia, J. (Ciudad Sanitaria de la Seguridad Social, Universidad Autonoma, Barcelona, Spain). *Endoscopy* 9(3): 177-179; 1977.

8213 GASTRIC CANCER IN THE HAWAII JAPANESE. (Eng.) Stemmermann, G. N. (Kuakini Medical Center, 347 N. Kuakini St., Honolulu, HI 96817). *Gann* 68(5):525-535; 1977.

8214 THE ULTRASONIC DEMONSTRATION OF GASTRIC LESIONS. (Eng.) Mascatello, V. J.; Carrera, G. F.; Telle, R. L.; Berger, M.; Holm, H. H.; Smith, E. H. (Georgetown Univ. Sch. Medicine, 3900 Reservoir Rd., N.W., Washington, DC 20007). *J. Clin. Ultrasound* 5(6):383-387; 1977.

8215 ISOLATED GASTRIC ANTRAL ULCERATION FROM INGESTION OF A SINGLE CLINITEST® TABLET. (Eng.) Colbert, P. M.; Sanders, P. D.; Frankl, H. (French Medical Clinic, Inc., 1941 Johnson Ave., San Luis Obispo, CA 93406). *Gastrointest. Endosc.* 24(2):82-83; 1977.

8216 SPLENIC VEIN THROMBOSIS: A CAUSE OF GASTRIC VARICES AND UPPER GASTROINTESTINA BLEEDING. (Eng.) Amarnani, N. H.; Broor, S. L.; Varma, R. R.; Maddison, F.; Geenen, J. E. (Milwaukee County General Hosp., 8700 West Wisconsin Ave., Milwaukee, WI 53226). *Gastrointest. Endosc.* 24(2):83-85; 1977.

8217 IATROGENIC PROBLEMS FOLLOWING GASTRIC SURGERY. (Eng.) Jay, B. S.; Burrell, M. (Yale-New Haven Hosp., 333 Cedar St., New Haven, CT 06510). *Gastrointest. Radiol.* 2(3):239-257; 1977.

8218 POSTGASTROSTOMY DEFORMITY OF THE STOMACH. (Eng.) Bryk, D. (Jewish Hosp. and Medica Center of Brooklyn, 555 Prospect Place, Brooklyn, NY 11238). *Gastrointest. Radiol.* 2(3):259-261; 1977.

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8041, 8042, 8043, 8044, 8046, 8048, 8
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8167, 8169, 8171, 8175, 8178, 8182, 8
8192, 8197, 8259, 8266, 8267, 8271, 8
8273, 8280, 8281, 8285, 8287, 8292, 8
8402, 8437, 8439, 8507, 8566, 8572, 8
8574, 8595, 8596.

STOMACH

Peptic Ulcers

257 IN-PATIENT TREATMENT OF PEPTIC ULCER WITH CIMETIDINE. I. EFFECT ON DUODENAL ULCER ALING.

(Ger.) Malchow, H.; Sewing, K. F.; Al-nus, M.; Horn, B.; Schomerus, H.; Dolle, W. (Medi-nische Universitatsklinik, Otfried-Muller-Strasse , 7400 Tubingen, W. Germany). *Dtsch. Med. Wochen-hr.* 103(4):149-152; 1978.

e effectiveness of cimetidine in the treatment peptic duodenal ulcer was studied in 67 patients a 6-week double-blind trial. All patients re-ived dimagnesium aluminum trisilicate (3 g/day). irty-three patients received cimetidine (4 x 300 ;/day p.o.) and 34 controls received placebo. Pain lief was significantly (p<0.01) better during the t week of treatment in the cimetidine-treated oup than in the controls. Healing of the ulcers s observed in 16/33 patients in the cimetidine oup and in 7/34 patients in the placebo group ter the first 2 weeks of treatment, but there was statistically significant difference at the end the third week (23/33 versus 18/34, resp.), nor the end of the 6-week treatment (30/33 versus /34, resp.). Neither basal nor pentagastrin-imulated acid and pepsin secretions were af-cted by the 17-day administration of cimetidine. e drug had to be withdrawn in two cases because elevated serum creatinine levels, but there re no other side-effects. Cimetidine had no ng-term effects independent of the period its presence in the blood. Compared with lit-ature data on out-patients, the in-patient treat-nt caused faster healing in both the cimetidine d placebo groups.

58 IN-PATIENT TREATMENT OF PEPTIC ULCER WITH CIMETIDINE. II. CONTROLLED DOUBLE-IND TRIAL IN GASTRIC ULCER PATIENTS.

(Ger.) wing, K. F.; Malchow, H.; Albinus, M.; Horn, B.; homerus, H.; Dolle, W. (Pharmakologisches In-itut der Universitat, Wilhelmstrasse 56, 7400 bingen, W. Germany). *Dtsch. Med. Wochenschr.* 3(4):152-154; 1978.

e effectiveness of cimetidine (4 x 300 mg/day o.) on the healing of peptic gastric ulcer was udied in 20 patients and in 16 placebo-treated ntrols in a double-blind trial. All patients ceived dimagnesium aluminum trisilicate (3 g/ y). The average duration of the in-patient eatment was 28 days, and follow-up for healing ntinued for up to 6 weeks. The number of pa-ents healed at the end of the 3rd week was 10/20 the treated group versus 5/16 in the control oup. At the end of the 6th week, the ulcers were aled in 17/20 patients versus in 10/16 placebo-eated controls; the difference was not statisti-lly significant. There were also no signif-ant differences in pain alleviation. Cimetidine d no influence on pentagastrin-stimulated acid d pepsin secretion. There were no serious un-ward reactions to cimetidine.

8259 MAXIMUM ACID OUTPUT IN DUODENAL ULCER PATIENTS WITH DIFFERENT LENGTH OF HISTORY AND CONTROLS WITHOUT DYSPEPSIA.

(Eng.) Kronberg, O.; Christiansen, P. M. (Bispebjerg & Hvidovre Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 12 (8):957-962; 1977.

To investigate the hypothesis that maximum acid output (MAO) in duodenal ulcer (DU) patients is normal in those with an ulcer history of <3 yr but elevated in those with a longer history, MAO was measured in 3 groups of 21 men and 4 groups of 9 women with operatively verified DU and ulcer histories of <3, 3-6, or 7-10 yr. The results were compared with that of age-matched controls with no history of dyspepsia. An augmented histamine test was performed on patients and controls. The activity of the ulcer at surgery was evaluated as to the presence of an ulcer crater or duodenal scar. The rate of recurrent DU was studied in relation to the length of ulcer history. No significant relationship was found between the length of ulcer history and the activity of the ulcer or the recurrence rate. The risk of recurrent DU showed no tendency to increase with the length of history before vagotomy. For both men and women, the uncorrected mean values of MAO were significantly higher in patients with symptoms for <3 yr compared to controls (men, 42.1 ± 3.4 versus 24.2 ± 0.8 or 20.8 ± 1.6 mmol/hr in controls, p<0.001; women, 24.9 ± 2.9 versus 16.4 ± 1.5 mmol/hr in controls, p<0.05), but patients with longer histories had MAO values similar to those of the patients with <3 yr histories. When MAO values were corrected for weight or stature, they were significantly higher (p<0.001) than control values in all men (regardless of the length of ulcer history). Neither the men nor women showed any significant changes of MAO with increasing length of history. In a group of 11 men with duodenal ulcer histories of less than 1 yr, the MAO values (uncorrected and corrected) were also significantly higher (p<0.001) compared with controls. When groups of 16 men with histories of up to 22 yr were studied, a fixed proportion of hypersecretors (uncorrected MAO above 30 mmol/hr) was found among patients with up to an 18-yr ulcer history; when history exceeded 18 yr, a tendency toward smaller numbers of hypersecretors was noted. The present study does not support the hypothesis that the risk of ulcer recurrence after vagotomy and drainage is related to MAO before surgery, nor does it support the assumption that gastric hypersecretion is a result of duodenal ulceration. MAO was elevated above normal values in all ulcer patients, even those with histories of less than 1 or 3 yr.

8260 QUANTITATIVE STUDIES OF GASTRIN CELLS (G CELLS) AND PARIETAL CELLS IN RELATION TO GASTRIC ACID SECRETION IN PATIENTS WITH PEPTIC ULCER DISEASE.

(Eng.) Stave, R.; Myren, J.; Brandtzaeg, P.; Gjone, E. (Rikshospitalet, Oslo, Norway). *Scand. J. Gastroenterol.* 13(3):293-298; 1978.

Stomach specimens from 42 patients subjected to partial gastric resection for gastric ulcer (12), duodenal ulcer and uremia (14), duodenal ulcer without uremia (11), and gastric cancer (5) were studied to determine possible relationships between acid output, parietal cell density in the body mucosa and the various parameters of the antral G cell population. Gastric acid secretion was measured before surgery. In the material as a whole, the antral G cell density was 35.6 ± 15.2, the G cell distribution was 71.7 ± 21.5 cm^2, the total antral G cell mass was 2,551 ± 1,780.3, and the parietal cell density in the body mucosa was 190.0 ± 89.4. The basal acid output (BAO) was 3.7 ± 4.3 mEq/hr and the pentagastrin-stimulated acid output (MAO) was 25.8 ± 15.7 mEq/hr. In the material as a whole there was a significant positive correlation between the parietal cell density and MAO ($r=0.589$, $p<0.01$), negative correlation between parietal cell density and age ($r=-0.365$, $p<0.02$), and positive correlation between antral G-cell mass and BAO ($r=0.331$, $p<0.05$). Analysis of the individual groups revealed significant correlations between parietal cell density and MAO in patients with duodenal ulcer and uremia ($r=0.711$, $p<0.05$) and in those with gastric cancer ($r=0.934$, $p<0.05$) and a borderline significance in the gastric ulcer patients ($r=0.520$). There was a significant negative correlation between parietal cell density and age in the group of patients with duodenal ulcer and uremia ($r=-0.606$, $p<0.05$). The correlation between G cell mass and BAO was at the borderline of significance in the gastric ulcer patients ($r=0.539$) and in the duodenal ulcer with uremia group ($r=0.537$). No correlation between the parietal cell density and the various parameters of the antral G cell population in the material as a whole or in any of the individual patient groups was found. There was a falling trend in gastric acid output with advancing age. Possible flaws in the experimental design, including the heterogeneity of the patient material as a whole, the limited categorization, the limited numbers of patients, and the inability to match patients with regard to age and sex are analyzed. The authors conclude that, as each of five hormones has the dual proper-smaller LA and LA:PY ratio increments; this did not occur with X. B usually increased LA and the LA:PY ratio. In the treatment of cirrhotic patients, a combination of G and insulin is recommended. If G cannot be used, then X or S is preferred to F. The simultaneous administration of sugars and insulin seems advantageous, while the combination of sugars with B appears risky.

8261 GASTRIC EMPTYING OF INGESTED ACID AND ITS EFFECTS ON PLASMA GASTRIN AND SECRETIN IN DUODENAL ULCER SUBJECTS. (Eng.) McLoughlin, J. C.; Green, W. E. R.; Buchanan, K. D. (Dept. Medicine and Surgery, Queen's Univ. Belfast, Belfast, Northern Ireland). *Scand. J. Gastroenterol.* 13(3): 313-319; 1978.

The gastric emptying of 250 ml of 0.1 M hydrochloric acid labeled with 1 mCi ^{113m}Indium chloride was followed in 16 normal and 15 duodenal ulcer (DU) subjects to evaluate their ability to handle a standard acid load. The time required for dischar
of half of the load was significantly shorter in D
subjects than in controls (33.6 ± 2.7 versus 48.5
5.3 min, $p<0.025$). The times required for the los
of the initial 20% of the load and for the intermediate phase of emptying were also significantly lower in the DU subjects than in controls (16.4 ± 2.5 versus 28.4 ± 4.8 min, $p<0.025$ and 20.8 ± 1.1 versus 27.4 ± 2.5 min, $p<0.0125$, resp.). In norma
subjects, ingested acid suppressed plasma gastrin below basal values at 15 min ($p<0.025$), and signif
cant suppression continued to the end of the study
In DU subjects, significant suppression ($p<0.05$) o
plasma gastrin concentration occurred 45 min after acid ingestion, and suppression lasted to the end
the experiment. Controls showed no significant elevation in mean plasma secretin level at any poi
but DU subjects demonstrated significant ($p<0.025$) elevation at 5 min after acid consumption. When the mean plasma secretin concentrations were calculated for the intermediate phase of gastric empyti
(process at steady rate) the increment in plasma secretin showed significant correlation with the rate at which acid left the stomach (in DU subject
$r=0.816$, $p<0.0025$ and in control, $r=0.688$, $p<0.01$)
The point where the regression lines intersect the abscissa represents a quantitative acid threshold for measurable secretin release. It occurred in D
subjects at 0.413 mmol/min and in controls at 0.02
mmol/min, $p<0.01$. The higher threshold in DU subjects suggests that defective secretin release at intermediate acid flow rates results in defective augmentation of the acid-neutralizing processes by secretin-stimulated pancreatic juice at high level
of acid production. The results show that DU subjects as a group discharge an acid load from the stomach more rapidly than do control subjects. Th
appearance of a quantitative threshold for secreti
release of about 0.3 acid mmol/min suggests that secretin acts in a reserve capacity, stimulating the flow of pancreatic bicarbonate only when high levels of acidity require it.

8262 GASTROESOPHAGEAL SPHINCTER PRESSURE AND SERUM GASTRIN: REACTION TO FOOD STIMULATION IN NORMAL SUBJECTS AND IN PATIENTS WITH GASTR
OR DUODENAL ULCER. (Eng.) Csendes, A.; Oster, M.
Brandsborg, O.; Moller, J.; Amdrup, E. (Hospital
J. Aquirre, Santos Dumont 999, Santiago, Chile). *Scand. J. Gastroenterol.* 13(3):363-368; 1978.

The effect of solid food on gastroesophageal sphi
pressure (GESP) and serum gastrin concentration (SGC) was studied in patients with gastric ulcers (GU), duodenal ulcers (DU), and in normal control
GESP and SGC measurements were made in the restin
state and then followed for 2 hr after the ingest
of a normal mixed meal (29 g of protein, 28 g of
and 2 g of carbohydrates), a potato meal (3 g prot
8 g fat, and 38 g carbohydrate), or an i.v. infus
of Aminosol (70% amino acids and 30% small peptid
total protein, 25 g). No significant differences
demonstrated in the basal GESP or SGC values amon
three groups. After the intake of the protein mea
GESP rose 2.6 ± 1.2 mm Hg/min in controls and 5.0

2.9 mm Hg/min in DU patients, while the SGC rose 19.5 ± 6.2 and 27 ± 7 pg/ml/min, resp. These nearly parallel increases are thought to be inter-related and due to the presence of intraluminal proteins in the upper gastrointestinal tract. The protein meal-stimulated GESP was significantly ($p<0.05$) higher than basal GESP from 60 to 100 min after eating (peak at 80 min in controls and at 60 min in DU patients). In GU patients, a decrease in GESP (-7.0 ± 1.4 mm Hg/min) and a rise in SGC (125 ± 41 pg/ml/min) occurred after protein meal ingestion. The decrease was significantly ($p<0.05$) lower than basal values from 60 to 100 min postprandially (peak decrease at 80 min). The increase in SGC was significant ($p<0.05$) in GU patients at 30 and 45 min, while in DU patients, it was significant ($p<0.05$) at 15, 30, and 45 min postprandially. There was no variation in SGC compared with basal values in any subject after ingestion of the potato meal or during the i.v. infusion of Aminosol. When the potato meal was given to two controls and two DU patients, the GESP decreased (peak decrease at 40 min, returning to basal values at 80 min). The i.v. infusion of Aminosol in a normal and a DU patient produced no GESP changes. The results show that the effect of protein food on GESP is different for GU and DU patients, possibly due to an alteration in the intrinsic properties of the specialized sphincteric muscle. The effect of food is mediated by proteins in the gastrointestinal tract.

8263 A COMPARATIVE STUDY OF DOUBLE CONTRAST AND SINGLE CONTRAST BARIUM MEALS WITH ENDOSCOPIC ARBITRATION IN THE DIAGNOSIS OF PEPTIC ULCER. (Eng.) Lavelle, M. I.; Venables, C. W.; Douglas, A. P.; Thompson, M. H.; Owen, J. P.; Hacking, P. M. (Royal Victoria Infirmary, Newcastle upon Tyne, England). *Clin. Radiol.* 28(6):625-627; 1977.

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8266 RELATION OF THE ACID CONCENTRATION OF THE PARIETAL COMPONENT OF THE GASTRIC JUICE TO THE MAXIMAL ACID OUTPUT IN MAN. (Eng.) Ligny, G.; Smets, Ph. (Hopital Civil, Boulevard Janson, 6000 Charleroi, Belgium). *Biomedicine* 26(6):396-399; 1977.

8267 A FIBREENDOSCOPIC STUDY OF ACUTE UPPER GASTROINTESTINAL HEMORRHAGE IN NAIROBI, KENYA. (Eng.) Hansen, D. P.; Daly, D. S. (Dept. Medicine, Univ. California--San Diego, 225 W. Dickinson St., San Diego, CA 92103). *Am. J. Trop. Med. Hyg.* 27(1):197-200; 1978.

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8270 2. VAGOTOMY AND ITS VARIATIONS. (Eng.) Doris, P. J. (Hotel-Dieu Hosp., Kingston, Ontario K7L 3H6, Canada). *Can. J. Surg.* 21(1):19-20; 1978.

8271 EFFECTS OF INTRAVENOUS TRITHIOZINE (I.S.F. 2001) ON GASTRIC SECRETION IN MAN. (Eng.) Corinaldesi, R.; Luchetta, L.; Ricci, P.; Guidoboni, R.; Casadio, R.; Fabbri, R.; Barbara, L. (Dept. Gastroenterology, Univ. Bologna, Bologna, Italy). *Panminerva Med.* 19(5):333-338; 1977.

8272 CROSS-OVER CLINICAL COMPARISON BETWEEN ANTI-SECRETORY ACTIVITY OF PROPANTHELINE BROMIDE AND TRITHIOZINE (I.S.F. 2001). (Eng.) Corinaldesi, R.; Luchetta, L.; Ricci, P.; Guidoboni, R.; Casadio, R.; Fabbri, R.; Barbara, L. (Dept. Gastroenterology, Univ. Bologna, Bologna, Italy). *Panminerva Med.* 19(5):339-344; 1977.

8273 SERUM GASTRIN LEVELS IN THE DIFFERENTIAL DIAGNOSIS OF RECURRENT PEPTIC ULCERATION DUE TO RETAINED GASTRIC ANTRUM. (Eng.) Webster, M. W.; Barnes, E. L.; Stremple, J. F. (Univ. Pittsburgh Sch. Medicine, Pittsburgh, PA). *Am. J. Surg.* 135(2):248-252; 1978.

8274 EFFECT OF HIGHLY SELECTIVE VAGOTOMY ON GASTRIC MOTOR ACTIVITY OF DUODENAL ULCER PATIENTS. (Eng.) Bortolotti, M.; Labo, G.; Serantoni, C.; Ciani, P. (Dept. Clinical Medicine, Univ. Bologna, Bologna, Italy). *Digestion* 17(2):108-120; 1978.

8275 GASTRIC EMPTYING AFTER DIFFERENT SURGICAL PROCEDURES FOR DUODENAL ULCER. (Eng.) Faxen, A.; Berger, T.; Kewenter, J.; Kock, N. G. (Sahlgren's Hosp., Univ. Goteborg, Goteborg, Sweden) *Scand. J. Gastroenterol.* 12(8):983-987; 1977.

8276 GASTRIC RESPONSE TO MEAT EXTRACT STIMULATION IN PATIENTS WITH GASTRODUODENAL ULCER AND PATIENTS AFTER VAGOTOMY OR ANTRECTOMY. (Eng.) Tani, M.; Shimazu, H.; Takahashi, T.; Asakuma, S.

(Univ. Tokyo Faculty Medicine, Tokyo, Japan). *Jpn. J. Surg.* 8(1):10-18; 1978.

8277 ENDOSCOPIC AND RADIOLOGICAL ASSESSMENT OF RECURRENT ULCERATION AFTER PEPTIC ULCER SURGERY. (Eng.) Salter, R. H.; Girdwood, T. G.; Scott-Harden, W. G.; Cole, T. P. (Cumberland Infirmary, Carlisle, England). *Br. J. Radiol.* 51(604):257-259; 1978.

8278 RESULTS OF ELECTIVE DUODENAL ULCER SURGERY IN WOMEN: COMPARISON OF TRUNCAL VAGOTOMY AND ANTRECTOMY, GASTRIC SELECTIVE VAGOTOMY AND PYLOROPLASTY, PROXIMAL GASTRIC VAGOTOMY. (Eng.) Herrington, J. L., Jr.; Sawyers, J. L. (Dept. Surgery, Vanderbilt Univ., Nashville, TN). *Ann. Surg.* 187(5):576-582; 1978.

8279 PLACEBOS, ANTACIDS AND CIMETIDINE FOR DUODENAL ULCER. (Eng.) Fordtran, J. S. (Univ. Texas Southwestern Medical Sch., Dallas, TX 75235). *N. Engl. J. Med.* 298(19):1081-1083; 1978.

8280 THE AARHUS COUNTY VAGOTOMY TRIAL. I. AN INTERIM REPORT ON PRIMARY RESULTS AND INCIDENCE OF SEQUELAE FOLLOWING PARIETAL CELL VAGOTOMY AND SELECTIVE GASTRIC VAGOTOMY IN 748 PATIENTS. (Eng.) Amdrup, E.; Andersen, D.; Hostrup, H. (Kommunehospitalet, 8000 Aarhus C., Denmark). *World J. Surg.* 2(1):85-90; 1978.

8281 THE AARHUS COUNTY VAGOTOMY TRIAL. II. AN INTERIM REPORT ON REDUCTION IN ACID SECRETION AND ULCER RECURRENCE RATE FOLLOWING PARIETAL CELL VAGOTOMY AND SELECTIVE GASTRIC VAGOTOMY. (Eng.) Andersen, D.; Hostrup, H.; Amdrup, E. (Kommunehospitalet, 8000 Aarhus C., Denmark). *World J. Surg.* 2(1):91-100; 1978.

8282 RUPTURE OF THE SPLEEN IN A PATIENT WITH A PERFORATED DUODENAL ULCER AND INFECTIOUS MONONUCLEOSIS. (Eng.) Gray, R. (King's Coll. Hosp. London SE5, England). *Postgrad. Med. J.* 54(627): 51-55; 1978.

See also, 7974, 8045, 8128, 8165, 8167, 8171, 8175, 8181, 8206, 8224, 8230, 8239, 8249, 8251, 8255, 8363, 8382, 8402, 8572, 8596.

SMALL INTESTINE

8283 PARAPROTEINEMIA IN NORMAL FAMILY MEMBERS OF EIGHT CASES WITH PRIMARY INTESTINAL LYMPHOMAS IN IRAQ. (Eng.) Alsabti, E. A. K. (Albaath Specific Protein Reference Unit, Baghdad, Iraq). *Oncology* 35(2):68-72; 1978.

The clinical and laboratory findings in eight patients with alpha-chain disease associated with primary intestinal lymphomas were analyzed, and the serum IgA level was determined in the families of these patients. The clinical, laboratory, radiological, and histopathological findings in the eight patients suggested malabsorption. Abdominal pain, diarrhea, and weight loss were present in all patients. The villous architecture was distorted in all patients; sparse crypts, pleomorphism and hypercellularity of the lamina propria, invasion of the muscularis mucosa, and lymphatic dilatation were present in six. The serum IgA levels ranged between 380 and 1,405 mg/100 ml. The serum IgG level was abnormally low (170-420 mg/100 ml) in all but one patient (1,120 mg/100 ml). The IgM levels ranged between 0 and 425 mg/100 ml. IgD levels were normal in all cases, ranging from 0 to 9.2 mg/100 ml. Of the 129 family members, 23 had abnormal IgA levels. This result suggests that these individuals should be carefully monitored for the development of intestinal lymphoma.

8284 CROHN'S DISEASE: "ITS GYNECOLOGIC ASPECT." (Eng.) Donaldson, L. B. (Medical Dental Bldg., Seattle, WA 98101). *Am. J. Obstet. Gynecol.* 131(2):196-202; 1978.

The medical records of 103 patients with gynecologic features of Crohn's disease are reviewed. The clinical history most frequently included signs and symptoms related to bowel obstruction. Specific signs and symptoms included abdominal pain in 63 cases; abscesses in 36 (13 pelvic, 11 perirectal, 8 perineal, 2 ischiorectal, 1 gluteal fold, and 1 epidural); tender adnexal mass in 28; rectal or perineal pain in 18; rectal bleeding in 12; vulvovaginitis, rectal fissure, or perineal ulcer in 8 cases each; right abdominal mass in 6; and dyspareunia in 4. The earliest signs and symptoms in some instances appeared to be unrelated to Crohn's disease and consisted of infections, ulcers, fissures, abscesses, and fistulas of the internal and external pelvic structures. Of 55 patients misdiagnosed, a large number had these prodromal gynecologic aspects of the disease. In over half of the 103 patients with Crohn's disease, intestinal obstruction was considered in the initial diagnosis. The diagnosis of the disease was first established at laparotomy in 23 of the 103 patients. The incorrect preoperative diagnoses in most instances were appendicitis (27), pelvic inflammatory disease (11), or ovarian cysts (5). There were 27 appendectomies performed, but there were no cases of acute appendicitis. The present study indicates no unfavorable effect of Crohn's disease on pregnancy; the effect of pregnancy on Crohn's disease appears to be minimal, with exacerbation of the disease occurring in only two patients in the immediate postpartum period. It is suggested that the gynecologic aspect of Crohn's disease should be considered in making a diagnosis, especially when abdominal pains and bowel complaints are present.

8285 JEJUNO-GASTRIC INTUSSUSCEPTION--GASTROSCOPIC DIAGNOSIS.

(Eng.) Varley, C. C.; Dyer, N. H. ("Stanhill," 34 Queens Rd., Melbourne, Victoria 3004, Australia). *Aust. N.Z. J. Med.* 7(5): 515-517; 1977.

The case of a patient in whom jejuno-gastric intussusception was diagnosed by gastroscopy is presented. The patient was a 76-yr-old woman who had undergone a Polya gastrectomy for pyloric stenosis complicating a duodenal ulcer 8 yr previously. She presented after developing colicky abdominal pain, projectile vomiting, and hematemesis. There was mild epigastric tenderness on examination. Gastroscopy revealed normal inflamed gastric mucosa of a Polya gastrectomy. At the stoma, the lumen of the afferent limb was patent and contained bile-stained fluid. The efferent limb lumen was filled with intussuscepted small bowel, which had a grossly swollen, engorged bleeding surface. The intussuscepted bowel extended nearly up to the hiatus. At laparotomy, the intussusception was reduced manually, and the patient had an uncomplicated recovery. Endoscopy is the method of choice to diagnose this uncommon, but important condition.

8286 ADAPTATIVE CHANGES IN THE SMALL INTESTINE FOLLOWING BYPASS OPERATION FOR OBESITY: A RADIOLOGICAL AND HISTOLOGICAL STUDY.

(Eng.) Solhaug, J. H.; Tvete, S. (Sjukhuset, 68500 Torsby, Sweden). *Scand. J. Gastroenterol.* 13(4):401-408; 1978.

Roentgenographic follow-up studies were made in seven patients before and at various intervals after jejunoileal bypass, to investigate adaptive changes to this procedure. Length measurements were made by a modified intubation technique, and intestinal transit time was estimated after a standard contrast meal. At surgery, 20 cm of proximal jejunum was anastomosed end-to-end to the distal 25 cm of ileum. With increasing observation time, a successive increase was observed in intestinal length both in the jejunal and ileal segments. One year after bypass, the mean growth of the functioning ileum was 100%, and the elongation of the jejunal segment was 50%. Eighteen months after the bypass, the mean growth values for the ileum and jejunum were 128% and 80%, resp. In serial films taken 4-6, 12, and 18 months after bypass, the diameter of both the functioning jejunum and ileum remained essentially unaltered. The mean increase in the diameter of the jejunum and ileum before and after bypass was approximately 40% and 50%, resp. The mean transit time of a test meal from the pylorus to the anastomotic level at 6, 12, and 18 months was 1.6 ± 0.6, 4.6 ± 6, and 4.8 ± 5 min, resp. The transit time from the anastomosis to the cecum was 38 ± 29, 55 ± 26, and 60 ± 28 min, resp. The postoperative gastric and functioning small intestinal emptying times were generally unaltered compared with preoperative findings. The mean increase in villous height in the functioning jejunum was 14% at 6 months after bypass and 55% after 12 months. In the ileum, the values were 32% and 66%, resp. In the bypassed ileum, the mean villous height decreased by 16% at 6 and 12 months. The observations suggest that there is an increase in intestinal absorptive surface following small intestinal bypass, which is due to dilatation and elongation of the functioning remnant as well as to an increase in villous height. An increase in transit time, permitting prolonged contact between nutrients and the absorptive intestinal surface, is probably a contributing factor in the leveling off of weight loss observed between 12 and 18 months after bypass.

8287 PEUTZ-JEGHERS SYNDROME: EXPERIENCE WITH TWENTY PATIENTS IN FIVE GENERATIONS.

(Eng.) McAllister, A. J.; Richards, K. F. (511 Medical Arts Bldg., Salt Lake City, UT 84111). *Am. J. Surg.* 134:717-720; 1977.

Experience with 20 patients in one family with the Peutz-Jegher's syndrome is reviewed, and the case report of a patient with an unusual presentation is given. The disease is characterized by pigmented spots on the lips and oral mucosa and intestinal polyposis. The intestinal polyps are hamartomas, and occur throughout the gastrointestinal system, with the heaviest incidence in the jejunum. In the family reported, which represents five generations, only three members were without symptoms. The clinical course of this syndrome is characterized by asymptomatic periods interspersed with complications such as intermittent cramping, abdominal pain, small intestinal intussusception, and hemorrhage. The patient whose case report is presented was unusual in that colonic intussusception was present. Examination revealed no abdominal masses, and bowel sounds were absent. Radiologic studies established the diagnosis of colonic intussusception. At surgery, 10 cm of the transverse colon was intussuscepted with a large leading polyp, measuring 5.5 x 4.5 x 4.0 cm, which was removed together with 11 cm of involved bowel. These observations suggest that intussusception can occur at any level of the gastrointestinal tract. The hematocrit should be checked every 6 months in patients with the Peutz-Jegher's syndrome to test for occult bleeding. X-ray films should be taken every 2 yr after the age of 10, and any polyps visualized in the stomach or colon should be removed endoscopically.

8288 RIGHT-SIDED DIAPHRAGMATIC HERNIA: NEONATA PRESENTATION ASSOCIATED WITH AN UNUSUAL PHYSICAL SIGN. (Eng.) Edelsten, A. D.; Tuck, S. (Royal Devon and Exeter Hosp., Exeter, England). *Br. Med. J.* 2(6099):1392-1393; 1977.

8289 SMALL-INTESTINAL OBSTRUCTION FROM A RICHTER'S HERNIA AT THE SITE OF INSERTION OF A LAPAROSCOPE. (Eng.) Bourke, J. B. (General Hosp., Nottingham, England). *Br. Med. J.* 2(6099):1393-1394; 1977.

8290 PNEUMATOSIS INTESTINALIS. (Eng.) Meyers, M. A.; Ghahremani, G. G.; Clements, J. L., Jr.; Goodman, K. (New York Hosp., 525 E. 68th St., New York, NY 10021). *Gastrointest. Radiol.* 2(2):91-105; 1977.

8291 ISCHEMIC JEJUNITIS AND PNEUMATOSIS INTESTINALIS SECONDARY TO ANASTOMOTIC OBSTRUCTION FOLLOWING JEJUNAL ATRESIA REPAIR. (Eng.) Kleinman, P. L.; King, D. R. (Natl. Naval Medical Center, Bethesda, MD 20014). *Gastrointest. Radiol.* 2(2):113-115; 1977.

8292 POLYPOID GASTRIC HETEROTOPIA CAUSING SMALL BOWEL INTUSSUSCEPTION. (Eng.) Santos, R.; Wills, J. S. (Wilmington Medical Center, Box 1668, Wilmington, DE 19899). *Gastrointest. Radiol.* 2(2):123-124; 1977.

8293 KNOTTING AND PERFORATION OF A MECKEL'S DIVERTICULUM. (Eng.) Desai, S.; Cook, R. C. M. (Preston Royal Infirmary, Deepdale Rd., Preston, Lancashire, England). *Z. Kinderchir.* 22(2):175-180; 1977.

8294 SPONTANEOUS RESOLUTION OF A MESENTERIC FIBROMATOSIS. (Eng.) Sturzaker, H. G.; Berry, C. L.; McColl, I. (Guy's Hosp., London, England). *J. R. Coll. Surg. Edinb.* 22(6):395-399; 1977.

8295 DUODENAL HODGKIN'S DISEASE. (Eng.) Balthazar, E. J. (Metropolitan Hosp. Center, 1901 First Ave., New York, NY 10029). *Am. J. Gastroenterol.* 68(3):306-311; 1977.

8296 PARADUODENAL HERNIAS. (Eng.) Bell-Thomson, J.; Vieta, J. O.; Yiavasis, A. A. (Lenox Hill Hosp., 100 E. 77th St., New York, NY 10021). *Am. J. Gastroenterol.* 68(3):254-259; 1977.

8297 DUODENAL VARICES: A RARE CAUSE OF UPPER GASTROINTESTINAL HEMORRHAGE. (Eng.) Schoettle, G. P., Jr.; Davis, W. D., Jr.; Bowen, J. C. (Ochsner Clinic, 1514 Jefferson Highway, New Orleans, LA 70121). *J. La. State Med. Soc.* 130(1):7-10; 1978.

8298 ENTERITIS CYSTICA PROFUNDA. (Eng.) Kyriakos, M.; Condon, S. C. (Barnes Hosp., Barnes Hosp. Plaza, St. Louis, MO 63110). *Am. J. Clin. Pathol.* 69(1):77-85; 1978.

8299 METABOLIC CHANGES AFTER JEJUNO-ILEAL BYPASS FOR OBESITY. (Eng.) Solhaug, J. H.; Grundt, I. (Dept. Surgery, Univ. Bergen, Bergen, Norway). *Scand. J. Gastroenterol.* 13(2):169-175; 1978.

8300 PREDUODENAL PORTAL VEIN: TWO CASES WITH DIFFERING PRESENTATION. (Eng.) Stevens, J. C.; Morton, D.; McElwee, R.; Hamit, H. F. (Charlotte Memorial Hosp., Charlotte, NC 28234). *Arch. Surg.* 113(3):311-313; 1978.

8301 RISKS OF SMALL BOWEL BIOPSY TECHNIQUES [Abstract]. (Eng.) Tytgat, G. (No affiliation given). *Scand. J. Gastroenterol.* 12 (Suppl. 47):18-19; 1977.

8302 A POSSIBLE CASE OF HYPOTHALAMIC HYPOFUNCTION CAUSED BY PROLONGED MALNUTRITION DUE TO INTESTINAL BLIND LOOP. (Eng.) Nakashima, T.; Fuchigami, T.; Inoue, K.; Omae, T. (Faculty Medicine, Kyushu Univ., Fukuoka 812, Japan). *Endocrinol. Jpn.* 24(6):529-536; 1977.

8303 EFFECT OF PREPARATION OF THE SMALL INTESTINE ON MICROFLORA AND POSTOPERATIVE WOUND INFECTION. (Eng.) Parker, T. H.; O'Leary, J. P. (Shands Teaching Hosp., Univ. Florida, Gainesville, FL). *Surg. Gynecol. Obstet.* 146(3):379-382; 1978.

See also, 8040, 8136, 8141, 8142, 8158, 8163, 8168, 8169, 8170, 8171, 8175, 8188, 8200, 8203, 8210, 8239, 8248, 8251, 8304, 8305, 8307, 8314, 8318, 8359, 8361, 8374, 8398, 8507, 8508, 8564, 8571, 8573, 8574, 8575, 8577, 8601, 8602, 8606, 8619.

Malabsorption

04 STANDARDIZED ('TRIFIXED') DIET IN THE STUDY OF CHRONIC MALABSORPTION SYNDROMES.

ng.) Hylander, E.; Jarnum, S.; Keldsbo, I. L.;
ale, M. (Rigshospitalet, 2100 Copenhagen O, Den-
rk). *Scand. J. Gastroenterol.* 13(4):423-431;
78.

testinal absorption was studied in patients with
fferent types of malabsorption syndromes who were
aced on diets with fixed amounts of calcium, ox-
ate, and fat. The patients included 70 with
ohn's disease, 11 with ulcerative colitis, 40
o had undergone an intestinal bypass operation,
with nontropical sprue, 10 with short-bowel syn-
ome, and 3 with other gastrointestinal diseases.
e patients received 70 g of fat, 800 mg of cal-
um, and 200 mg of oxalate daily in their diet.
cal fat, ^{47}Ca absorption, ^{14}C-oxalate absorption,
d renal oxalate excretion were measured, and in
e majority of patients a ^{14}C-glycocholic acid
eath test was also performed. In 83 patients in
om calcium absorption was determined by whole-
dy counting and by the accumulation of absorbed
Ca in the skeleton of the underarm, ^{47}Ca absorp-
on was almost identical ($r=0.92$, $p<0.001$) by the
o procedures. ^{14}C-oxalate absorption and renal
alate excretion in the 138 patients in whom both
ocedures were carried out also correlated well
$=0.85$, $p<0.001$). Fecal fat and renal oxalate ex-
etion were weakly correlated ($r=0.63$, $p<0.001$),
t there was no correlation between fecal fat
d calcium absorption or between oxalate and cal-
um absorption. It is recommended that the "tri-
xed" regimen with absorption studies of fat, cal-
um, and oxalate be undertaken before treatment
r the reduction of steatorrhea or hyperoxaluria
for improvement of calcium absorption in chronic
labsorption syndromes.

05 SMALL-BOWEL MALABSORPTION AND GASTRO-INTESTINAL MALIGNANCY.

(Eng.) Collins,
M.; Hamilton, J. D.; Lewis, T. D.; Laufer, I.
cMaster Univ. Medical Center, Hamilton, Ontario,
nada). *Radiology* 126(3):603-609; 1978.

e cases of four patients with malabsorption and
strointestinal malignancies are presented. All
tients demonstrated histological and radiological
atures of celiac disease and showed improvement
gluten withdrawal. The first patient had been
ymptomatic for 27 yr after experiencing symptoms
malabsorption, diagnosed as tropical sprue. He
veloped diarrhea, steatorrhea, anorexia, leth-
gy, and weight loss, which resolved upon with-
awal of dietary gluten. A squamous cell carcin-
a of the middle third of the esophagus was dis-
vered 2 yr later; no abnormality could be
tected on the esophagrams taken 2 yr earlier.
e second patient had a childhood history of
liac disease but had been relatively asympto-
tic on a normal diet since the age of 15 yr.
the age of 47, he developed severe steatorrhea, weight loss, finger clubbing, and abdominal distention, and the symptoms did not improve on gluten withdrawal, even when prednisone was added to the regimen. A high serum IgA level was present, suggesting a lymphoma. Small bowel biopsy returned to normal and marked clinical improvement occurred when vincristine and cyclophosphamide were added to the regimen. A small bowel enema study suggested extrinsic ileal compression, and an unresectable, mesenteric, poorly differentiated reticulum cell sarcoma was discovered. The third patient presented with a 1-yr history of symptoms of malabsorption at age 74. Subtotal villous atrophy persisted, despite a 3-month period of gluten withdrawal. Following the removal of an *in situ* jejunal adenocarcinoma, there was marked clinical improvement while the patient was on a gluten-free diet, and a jejunal biopsy showed considerable improvement. The last patient, a 55-yr-old man, developed celiac disease that was initially responsive to gluten withdrawal; he became unresponsive with the development of pancreatic carcinoma. With a combination of prednisone and gluten withdrawal, he was once again rendered gluten-sensitive, as demonstrated by his marked clinical improvement and by the dramatic deterioration that occurred when gluten was accidentally reintroduced. It appears that there is an increased incidence of gastrointestinal malignancy in patients with celiac disease. These patients should have regular radiographic surveys.

8306 MALABSORPTION IN INFECTIOUS MONONUCLEOSIS.

(Eng.) LoIudice, T. A.; Lang, J. A. (Cedar-Locust Medical Pavilion, Ste. 206, 157 W. Cedar St., Akron, OH 44307). *Am. J. Gastroenterol.* 67(6):604-607; 1977.

The case of a patient in whom infectious mononucleosis was complicated by malabsorption is presented. The patient, a 23-yr-old man, presented with a fever of 40 C, cramping abdominal pain, nausea, vomiting, diarrhea, polyarthralgias, light-headedness, irritability, malaise, anorexia, and weight loss. A mono spot test was positive and a heterophil titer was 1:1,448. When diarrhea continued for longer than 1 week, further investigations were undertaken. The results of these included a d-xylose excretion (25 g p.o. dose) of 2.5 g/5 hr, a 72-hr stool fat of 36 g, and a duodenal aspirate that revealed no organisms. In addition, a small bowel roentgenographic series showed extensive thickening of mucosal folds with puddling of barium, and a jejunal biopsy revealed marked blunting of villi with an inflammatory infiltrate in the lamina propria. The patient responded to treatment consisting of i.v. fluid and electrolyte replacement, i.m. codeine, and bed rest. Two months after admission, a mono spot test was negative and the results of a small bowel series and a repeat small bowel biopsy had returned to normal. Malabsorption appears to be a rare complication of this disease.

8307 COMPLETE CLINICAL, HISTOLOGICAL, AND IMMUNOLOGICAL REMISSION IN A PATIENT WITH ALPHA-CHAIN DISEASE TREATED BY ORAL ANTIBIOTICS. (Fre.) Rambaud, J. C.; Piel, J. L.; Galian, A.; Leclerc, J. P.; Danon, F.; Girard-Pipeau, F.; *et al.* (Hopital Saint-Lazare, 107 bis, rue du Faubourg-Saint-Denis, F 75475 Paris Cedex 10, France). *Gastroenterol. Clin. Biol.* 2(1):49-61; 1978.

A case is presented of alpha-chain disease in a 17-yr-old Algerian boy who had no history of immunological disease in his family (parents and five siblings). Initial symptoms were fever, vomiting, diarrhea, and abdominal pain. All symptoms except diarrhea subsided at first, but latter grew progressively worse with weight loss, edema of lower limbs, and finally tetany. Rectal and gastric biopsies obtained by endoscopy suggested the diagnosis of alpha-chain disease (plasma cell infiltrations of mucosal crypts) that was confirmed by immunological studies. The patient was treated by various antibiotics (tetracycline, metronidazole, ampicillin, colistine, and amphotericine) over a 3-month period. After only 12 days on antibiotics, intestinal malabsorption improved and the abnormal IgA disappeared from the serum but not from the intestinal cellular infiltrate. Restoration of the severe magnesium depletion resulted in normal blood calcium levels and disappearance of tetany. A *Giardia lamblia* infection was cured at the same time. The complete remission of symptoms was confirmed by biopsy performed at laparotomy 6 months after end of antibiotic treatment. Proximal jejunal biopsy showed normal plasma cells with a moderate increase of the alpha-chain IgA cells compared with the normal state.

8308 SHORT-TERM GLUTEN CHALLENGE TEST IN CELIAC DISEASE. (Ita.) Mastella, G.; Trabucchi, C.; Mengoli, V.; Olivieri, D.; Rossi, F. A. (Ospedale Infantile Alessandri, Verona, Italy). *Minerva Pediatr.* 29(37):2235-2252; 1977.

An analysis of the short-term gluten challenge test in celiac disease is presented. Ninety-one children (aged 12 months-10 yr) were divided into three groups: 29 diagnosed as having celiac disease (group 1), 45 patients with chronic diarrhea of unknown etiology (group 2), and 17 with recurrent intestinal disturbances (group 3). All received gluten for 9-17 days either as commercial gluten (800 mg/kg intradermally/day) or in normal alimental form (10-25 g/day). The body weight, number and character of defecations, circumference of the abdomen, mood and physical activity, general clinical results, biopsy of the intestinal mucosa, xylose absorption test, and levels of IgA, IgG, IgM, and the C'3 complement fraction were monitored over a 20-day period. The condition of the intestinal mucosa was numerically evaluated over the range from 0-3 (grade 3 lesion) to 10-12 (normal mucosa). The average values before treatment were 5.29 (group 1), 7.55 (group 2), 9.24 (group 3), and after treatment were 3.48 (group 1, $p<0.05$), 6.87 (group 2), and 9.05 (group 3). The xylose absorption test showed positive but insignificant differences after treatment in 20/32 tests in grou 1, 21/45 tests in group 2, and 4/19 tests in group 3. Changes in the coefficient of absorption of fat (C.A.%) before and after treatment were 91.92 to 90.81 C.A.% in group 1, 93.91 to 94.75 C.A.% in group 2, and 96.58 to 97.13 C.A.% in group 3; positive changes occurred in 17/33 tests in group 1, 10/52 tests in group 2, and 1/19 tests in group 3. The daily weight of the feces increased from 77.03 g to 122.76 g, $p<0.01$ in group 1, from 88.37 to 89.73 in group 2, and from 97.71 to 99.26 in group 3. Differences between groups 1 and 3 were significant for all four tests ($p<0.01$); between groups 1 and 2 were significant for the condition of the intestinal mucosa ($p<0.001$), C.A.% of fat ($p<0.01$), and weight of feces ($p<0.05$); and betwee groups 2 and 3 were significant only for the xylos test ($p<0.05$). On the basis of the gluten test, the diagnosis was celiac disease in group 1 patients, 6/45 group 2 patients, and 0/17 group 3 pa tients; no diagnosis could be reached on this basis in 4/29, 15/45, and 1/17 in groups 1, 2, and 3, resp. The variability of results with time in some patients suggests that the response to gluten is not constant, thus leaving a margin of uncertainty in a number of patients suspected of celiac disease. The results of the measurements of the immunoglobulins and C'3 fraction suggest that gluten does not have an immunogenic effect in these patients. It was concluded that the short-term gluten test is well tolerated in these patients and remains a useful test until a more definite one is found.

8309 TOLERANCE TO LACTOSE AMONG LACTASE-DEFICIENT AMERICAN INDIANS. (Eng.) Newcomer, A. D.; McGill, D. B.; Thomas, P. J.; Hofmann, A. F. (Mayo Clinic and Mayo Foundation, Rochester, MN 55901). *Gastroenterology* 74(1): 44-46; 1978.

8310 GIANT AXONAL NEUROPATHY: POSSIBLY SECONDARY TO VITAMIN B_{12} MALABSORPTION. (Eng.) Schochet, S. S., Jr.; Chesson, A. L., Jr. (Univ. Texas Medical Branch, Galveston, TX 77550). *Acta Neuropathol. (Berl.)* 40(1):79-83; 1977.

8311 DUAL OCCURRENCE OF CELIAC SPRUE AND IDIOPATHIC PORTAL HYPERTENSION. (Eng.) Drinka, P. J.; Imbeau, S. A. (Veterans Admin. Hosp Madison, WI). *Wis. Med. J.* 76(11):S134-S136; 1977

8312 CLINICAL MEASUREMENT OF IRON ABSORPTION. (Eng.) Cook, J. D.; Lipschitz, D. A. (Kansas Univ. Sch. Medicine, Kansas City, KS). *Clin. Hematol.* 6(3):567-581; 1977.

8313 CHRONIC CALCIFIC PANCREATITIS IN ASSOCI TION WITH CELIAC DISEASE. (Eng.) Pitchumoni, C. S.; Thomas, E.; Balthazar, E.; Sherling, E. (Metropolitan Hosp. Center, 1901 First Ave., New York, NY 10029). *Am. J. Gastroenterol.* 68(4):358-361; 1977.

314 CALCIUM MALABSORPTION AND ABSENCE OF BONE
DECALCINATION FOLLOWING INTESTINAL SHUNT
ERATION FOR OBESITY: A COMPARISON OF TWO TYPES
OPERATION. (Eng.) Dano, P.; Christiansen, C.
igshospitalet, Copenhagen, Denmark). *Scand. J.*
stroenterol. 13(1):81-85; 1978.

315 POSSIBILITIES OF DIFFERENTIATION BETWEEN
MORBID AND INVOLUTIVE CHANGES IN ENTERAL
SORPTION. COMMUNICATION 1: MORBID CHANGES OF
TERAL RESORPTION. (Ger.) Weiner, R.; Laue, R.;
etze, F.; Schone, D.; Weiner, C. (Bezirkskranken-
uses St. Georg, Str. der DSF 141, DDR-7021 Leipzig,
Germany). *Dtsch. Gesundheitsw.* 32(30):1423-
28; 1977.

8316 MALABSORPTION SYNDROME IN CHRONIC LYMPHOCYTIC LEUKEMIA: ENDOSCOPY OF THE UPPER SEGMENT OF THE SMALL INTESTINE. (Ger.) Cottier, C.; Fankhauser, S.; Clemencon, G. (Kantonsspital Olten, Olten, Switzerland). *Z. Gastroenterol.* 15(10):641-642; 1977.

See also, 8161, 8163, 8168, 8170, 8302, 8367, 8403, 8406, 8565, 8567, 8610.

LARGE INTESTINE

17 SYSTEMIC PROPHYLAXIS WITH DOXYCYCLINE IN
SURGERY OF THE COLON AND RECTUM. (Eng.)
jer, H.; Wetterfors, J. (Regionsjukhuset, S-581
Linkoping, Sweden). *Ann. Surg.* 187(4):362-368;
78.

prospective double-blind study on the effects of
xycycline as a prophylactic antimicrobial in elec-
ve colonic surgery was carried out in 118 patients.
fty-eight patients received 200 mg of doxycycline,
o., and 60 received placebo, 4-6 hr before surgery;
0 mg of doxycycline or placebo was given daily for
days postoperatively. A significantly lower inci-
nce of abdominal wound sepsis was seen in the
tients treated with doxycycline than in controls
.6 versus 41.5%, $p<0.001$). Abdominal septic
mplications of grade 3 and 4 in severity were
ss frequent in the treatment group ($p<0.01$).
croscopic peritoneal contamination occurred with
e same incidence in both groups but the rate of
sociated wound or intra-abdominal sepsis dropped
om 79% in the controls to 33% in the treated group.
en the wound culture was negative upon closure,
xycycline treatment caused a significant ($p<0.002$)
crease in the rate of abdominal wound sepsis.
xycycline treatment significantly reduced the rate
abdominal sepsis in malignant disease to 17%
om 70% in the controls ($p<0.001$), and significantly
duced the rate of abdominal sepsis in both strictly
tra- and mainly extraperitoneal procedures ($p<0.01$
both cases). Perineal infection occurred in 20%
patients in the doxycycline-treated patients and
47% of the controls; in the former group, it was
e sole septic complication, whereas in the latter
oup, the infection was combined with some type of
dominal sepsis. Doxycycline treatment also re-
ced the rates of urinary tract infections and
lmonary complications ($p<0.02$ and $p<0.04$, resp.).
ne of the doxycycline-treated patients required
peat laparotomy due to septic complications,
ereas eight patients in the control group required
rther surgery for sepsis. The results indicate
at doxycycline treatment significantly reduces
both the incidence and severity of postoperative sepsis in elective colorectal surgery.

8318 RISKS OF SURGERY OF THE GASTROINTESTINAL TRACT AFTER RADIATION OF THE ABDOMINAL AND PELVIC CAVITIES. (Fre.) Mendes da Costa, P.; Gerard, A. (Institut Jules-Bordet, 1, rue Heger-Bordet, 1000 Brussels, Belgium). *Ann. Chir.* 31(10):866-870; 1977.

Two distinct groups were observed for complications after surgery preceded by radiation of the abdominal or pelvic cavities. Group I was composed of 47 patients who underwent amputation of the rectum by the abdomino-perineal route for adenocarcinomas. This group had been treated at random with 3,450 rads of radiation over a 19-day period with surgery following within 8 days of the last radiation treatment. Alternative random treatment was chemotherapy with 5-fluorouracil (1,500 mg/m^2) 4 days prior to surgery. Group II was composed of 42 patients all of whom underwent surgery of the gastrointestinal tract including colostomy of the rectum (14), resection and anastomoses (4), or liberation of adhesions of the small intestine (2), and resection and anastomoses or colostomy of the colon (8). These patients had been treated with 4,500-6,000 rads previously with an average delay between radiotherapy and surgery of 13.3 months. In 28/42 patients in group II, surgery was necessitated by a radiation lesion of the small intestine, colon, or rectum; in 13 patients, surgical intervention was performed because of residual or recurrent neoplasm. There were five postoperative deaths in group I and seven postoperative deaths in group II. Complications in group I included cystitis (14), infection of the perineum (11), abdominal abscess (5), necrosis of the colostomy (3), obstruction of the intestine (4), and a small intestine fistula (1). Complications in group II included infection (19), abscess (7), failure of anastomoses (7), intestinal obstruction (5), fistula of the digestive tract (4), paralytic ileus (2), and necrosis of the colostomy (2). It is concluded that utero-ileal anastomoses are contraindicated in previously irradiated patients, but intestinal anastomoses may be performed if sufficient collateral circulation is present.

8319 NEONATAL SMALL LEFT COLON SYNDROME: ITS RELATIONSHIP TO AGANGLIONOSIS AND MECONIUM PLUG SYNDROME.

(Eng.) Berdon, W. E.; Slovis, T. L.; Campbell, J. B.; Baker, D. H.; Haller, J. O. (Babies Hosp., 622 W. 168th St., New York, NY 10032). *Radiology* 125(2):457-462; 1977.

To clarify whether meconium plug syndrome, colon inertia, and neonatal small left colon syndrome can be distinguished from aganglionosis of the splenic flexure on radiographic and clinical grounds without recourse to rectal biopsy, experience with colon inertia and neonatal small left colon in 11 infants was reviewed and compared with other published reports and cases obtained by a hospital survey. Contrast enema studies of patients with colon inertia and those with small left colon syndrome were identical, showing distended loops of small bowel, right colon, and transverse colon with a sharp transition at the splenic flexure to a left-sided microcolon with a diameter of ≤1 cm; the rectum could be distended to a caliber of 2-3 cm while administering the enema. These radiographs were also identical to most of those published in cases of meconium plug syndrome; moreover, in many cases, meconium had been passed prior to the enema or else no plug was demonstrated. While the clinical presentation of these foregoing probably identical syndromes may be quite similar to that of aganglionosis of the splenic flexure (abdominal distention, full-term status, difficulty in passing meconium) and while all may have plain radiographic evidence of distended loops with frequent air/fluid levels and contrast enemas showing a transition zone, aganglionosis extending to the splenic flexure is readily differentiated from functional left-sided microcolon by the fact that aganglionic bowel is rarely reduced in caliber compared with normal bowel, whereas the microcolon has a caliber <1 cm. Whether or not to obtain a rectal biopsy in such cases must be based on the clinical response to the initial cleansing enemas and the subsequent course.

8320 SIGNIFICANCE OF CYTOLOGICAL INVESTIGATIONS IN THE DETECTION OF NEOPLASTIC CHANGES OF THE RECTOSIGMOID.

(Ger.) Miczban, I.; Feher, M. (Poliklinika, Janos Korhaz, Budapest, Hungary). *Tijdschr. Gastroenterol.* 20(4):237-250; 1977.

Six hundred eleven consecutive exfoliative cytological investigations of the rectosigmoid were performed in 578 patients. The patients were also examined histologically and clinically. The cytology was negative in 536 cases, which all were found to be normal histologically. The cytology was doubtful in 13 cases; ulcerative colitis was diagnosed histologically in 11 of these cases and tumor in 2. Cytology showed polyp in 18 cases; th histological examinations of these patients revealed ulcerative colitis in 1 and polyp in 17. The cytology showed malignant changes in 11 cases; one of them was diagnosed histologically as ulcerative colitis, another as polyp, and 9 as tumor. The cytology showed definitely malignant changes in 9/11 histologically confirmed cases of tumor, but it was doubtful in the other 2 cases. All tumors were operable. The findings indicate the great diagnostic value of exfoliative cytology of the rectosigmoid, especially in combination with fiber rectoscopy.

8321 MULTIPLE CARCINOMAS OF THE LARGE BOWEL: A NATURAL EXPERIMENT IN ETIOLOGY AND PATHOGENESIS.

(Eng.) Enker, W. E.; Dragacevic, (Pritzker Sch. Medicine, Chicago, IL). *Ann. Surg* 187(1):8-11; 1978.

Theories concerning bile acids in colon carcinogenesis were tested by assuming that if bile acid were involved in colon cancer, the incidence of left-sided second primary cancers in patients wit metachronous large bowel cancer would be higher than the incidence of right-sided cancers in patients undergoing an initial left colectomy. Of 121 patients with two or more large bowel cancers 56.2% presented with synchronous lesions, while the other 43.8% presented with metachronous (nonsimultaneous) lesions. Of the patients with meta chronous large bowel cancer, 28 of 47 had their first lesion on the left side; 13 patients had the first lesion on the right side, while the remaining 6 had the first lesion in the transverse colon. Of the 28 patients who had their first resection on the left side, 12 subsequently developed their second primary carcinoma on the right side. Of the 28 patients who had their fir resection on the left side, 13 developed their second primary lesion in the remaining portion of the left side. In contrast, of the 13 patients w had their first resection on the right side of th colon, 10 developed a second lesion in the left side of the colon. Thus, the incidence of second primary carcinomas in patients who first underwent an initial right-sided resection was much higher than the incidence of right-sided cancers in patients undergoing initial left colectomies, and was also higher than the initial incidence of left-sided lesions. These results support the concept that increased delivery of bile acids to the colon may play a role in tumor pathogenesis.

8322 FECAL CONSTITUENTS OF A HIGH-RISK NORTH AMERICAN AND A LOW-RISK FINNISH POPULATION FOR THE DEVELOPMENT OF LARGE BOWEL CANCER.

(Eng.) Reddy, B. S.; Hedges, A.; Laakso, K.; Wynder, E. L. (Naylor Dana Inst. for Disease Prevention, American Health Foundation, Valhalla, NY 10595). *Cancer Lett.* 4(4):217-222; 1978.

To elucidate the role of dietary factors in the

logy of large bowel cancer, dietary composi-
and feces collected in rural Kuopio, Finland
ow-risk population area for this cancer) and
he New York metropolitan area (a high-risk
lation area for this cancer) were studied.
oth populations, the average daily intake
at and protein was essentially the same,
the sources of fat came principally from
in the New York population and from milk
other dairy products in Kuopio. Bile acid and
ral sterol levels and the β-glucuronidase ac-
ty of the stool samples was measured. A three-
greater output of feces ($p<0.05$) was found in
io compared to New York, possibly due to a
intake of fiber-rich cereal products. The
l bacterial β-glucuronidase activity/mg dry
s was lower in Kuopio than New York (18.6 ±
versus 69.3 ± 15.8 μg product formed/4 hr),
the total daily output of this enzyme activity
the same for both groups (1,122 ± 158 and 1,545
3 x 10^{-3} μg product formed/day). A signifi-
ly lower ($p<0.05$) concentration of secondary
acids, such as deoxycholic, lithocholic, urso-
ycholic, and 12-ketolithocholic acids, was
d in Kuopio. These bile acids have been found
ct as colon tumor promoters in animals. The
fecal bulk noted in Kuopio diluted both the
l β-glucuronidase activity and the fecal sec-
ry bile acids. The daily excretion of neutral
ols was higher in Kuopio than in New York.
results suggest that diets low in meat and
in fiber coupled with high fecal bulk in
and may protect against colon cancer by di-
ng tumorigenic compounds that come in direct
act with the colon mucosa.

THE ROLE OF 5-FLUOROURACIL AS AN ADJUVANT TO THE SURGICAL TREATMENT OF LARGE BOWEL
ER. (Eng.) Grage, T. B.; Metter, G. E.; Cor-
, G. N.; Strawitz, J.; Hill, G. J., III; Fre-
, R. W.; *et al. In: Adjuvant Therapy of Can-*
(Amsterdam: Elsevier/North-Holland Biomedical
s): 259-263; 1977.

effect of adjuvant chemotherapy with 5-fluor-
cil (5-FU) upon survival and the recurrence
was studied in 282 patients with colorectal
inoma, of whom 204 underwent curative resec-
and 78 underwent palliative resection. Chemo-
apy was started within 30 days after surgery
consisted of i.v. 5-FU (12 mg/kg/day x 4 and
6 mg/kg on alternate days x 5, followed by 12
g/week for 1 yr). Follow-up ranged from 3
hs to 65 months with a median of 30 months.
he curative group, survival continued to be
rately more favorable in the 5-FU treatment
p, although the difference was not significant
.09). However, the treatment group had a sig-
cantly longer disease-free interval, as deter-
d by plotting a disease-free interval curve,
g the Kaplan-Meier life table method ($p=0.045$).
survival and disease-free interval were sig-
cantly better for patients with carcinoma of
colon versus rectum ($p=0.038$ and 0.027, resp.).
atients with rectal carcinoma, both survival
and disease-free interval were significantly better with chemotherapy ($p=0.024$ and $p=0.037$, resp.). The disease-free interval for patients with lymph node metastases was significantly longer for those on chemotherapy ($p=0.018$). There was no significant difference in survival between the patients who underwent palliative or curative resection. However, the asymptomatic interval in the chemotherapy group was slightly longer ($p=0.027$). It is concluded that the treatment benefit following 5-FU administration as an adjuvant to surgical treatment of colorectal cancer is small, mainly seen in prolongation of the disease-free interval and confined to patients with either lymph node metastasis or patients with rectal carcinoma.

8324 VILLOUS TUMORS OF THE RECTUM AND COLON: DIAGNOSTIC AND THERAPEUTIC PROBLEMS AND STATISTICS ON 78 CASES.

(Fre.) Delile, P.; Marche, C.; Edelmann, G. (Hopital Bichat, 170, Bd Ney, 75018 Paris, France). *Ann. Chir.* 31(10): 829-842; 1977.

Among 78 patients with villous tumors of the rectum and colon, the histological diagnosis was purely villous tumors in 59, villous polyadenomas in 11, and adenocarcinomas with villous processes in 8. The purely villous tumors are defined as those consisting only of epithelium; however, they can be sessile (45), nonprotruding (6), or in the form of polyps (8). Villous polyadenomas consist of benign tumors of glandular and epithelial tissue. Excluding the villous adenocarcinomas, there were 31 benign villous tumors and 7 suspect and 32 definitely malignant tumors. All the villous tumors of the colon and rectosigmoid (21) whether malignant or benign, were resected by the abdominal route, and there were no postoperative complications. A recall period of 6 months to 17 yr on these patients revealed two lost to follow-up and no recurrences, even though six patients had had stage II, III, or IV tumors. Various surgical procedures were used to extirpate 34 villous tumors of the rectum (21 benign, 13 malignant) implanted within 12 cm of the anal margin: transanal tumorectomy (27, of which 12 required further surgery or electrocoagulation for recurrence), trans-sacral tumorectomy (3), abdomino-transanal amputation of the rectum (2), and abdominoperineal amputation of the rectum (2), with 3 operations for recurrence. The recurrences always followed incomplete excision. It is stated that villous tumors of the rectum can always be treated by extensive local excision rather than rectal amputation unless there is obvious invasion of the submucosa or tumor degeneration.

8325 AGE-RELATED CHANGES IN THE COLONIC BLOOD SUPPLY: THEIR RELEVANCE TO ISCHAEMIC COLITIS.

(Eng.) Binns, J. C.; Isaacson, P. (Southampton Univ. Hosp., Southampton SO9 4XY, England). *Gut* 19(5):384-390; 1978.

The anatomy of the colonic circulation was studied by performing postmortem angiograms in 37 subjects of different ages (neonate-92 yr) to determine if age-related changes in the colonic blood supply are relevant to ischemic colitis due to nonocclusive mesenteric ischemia. Radiopaque material was injected into the superior mesenteric artery (SMA) or inferior mesenteric artery (IMA). Good filling of the colonic circulation was obtained in 23 of the 29 cases in which the SMA was injected. Of 13 cases of occlusion or severe stenosis of the IMA ostium, complete filling of the colonic circulation was obtained in 9. Good filling of the colonic circulation was obtained in five of the eight cases in which the IMA was injected. The diameter of the marginal artery decreased from right to left. The average diameters of the artery at the ascending colon, transverse colon, splenic flexure, and descending colon were 1.6 mm, 1.13 mm, 0.94 mm, and 0.89 mm, resp. In adults, the diameters were constant over the wide range of ages. In 17 of the 37 colons, the artery was continuous and specifically, no interruption or unusual narrowing was seen at the splenic flexure. In 11 other colons, the artery had been damaged during removal of the colon but appeared to be continuous. In young subjects, the long colic arteries were straight with almost complete absence of tortuosity. Regression lines calculated from graphs plotting tortuosity against age indicated that tortuosity of these vessels increases significantly with age ($p<0.01$ in transverse colon, $p<0.02$ at splenic flexure, $p<0.05$ in ascending colon, and $p<0.01$ in descending colon). These results demonstrate a distinct age-related tortuosity of the long colic arteries, which could account for the increasing incidence of ischemic colitis with age. No anatomical basis for the higher incidence of left-sided involvement was found, and no critical point in the arterial circulation at the splenic flexure was demonstrated.

8326 MANOMETRIC INVESTIGATION OF THE ANAL CANAL IN PRIMARY CHRONIC FISSURE BEFORE AND AFTER DILATATION OR SPHINCTEROTOMY. (Ger.) Fischer, M.; Thermann, M.; Hamelmann, H. (Chirurgische Universitatsklinik, Robert-Koch-Strasse 8, D-3550 Marburg, W. Germany). *Chirurg* 49(2): 111-113; 1978.

Manometric investigations were performed in the anal canal before and 6 months after stretching or sphincterotomy in 28 patients with primary chronic fissure of the anal canal. Compared with a proctologically healthy control group and with the values measured before intervention, the length of the functional anal canal did not change significantly after stretching and sphincterotomy, but the position of the maximum resting pressure shifted orad, though remaining within 1-2 cm from the anocutaneous border. The maximum resting pressure in the anal canal was significantly higher during the chronic fissure than either after stretching and sphincterotomy ($p<0.001$) or in the controls but there was no significant difference from the controls after the intervention. The findings indicate that an elevated resting anal pressure is one of the pathogenetic mechanisms in the development of primary chronic fissure and that it is eliminated efficiently by stretching or sphincterotomy.

8327 ULTRASTRUCTURE OF THE "TRANSITIONAL" MUCOSA ADJACENT TO LARGE BOWEL CARCINOMA [Abstract]. (Eng.) Riddell, R. H.; Levin, B. (Uni Chicago, Chicago, IL). *Gastroenterology* 72(5, Part 2):1119; 1977.

8328 Vibrio parahaemolyticus ENTEROCOLITIS IN BANGLADESH: REPORT OF AN OUTBREAK. (Eng Hughes, J. M.; Boyce, J. M.; Aleem, A. R. M. A.; Wells, J. G.; Mizanur Rahman, A. S. M.; Curlin, G. (Bureau Epidemiology, Center Disease Control, Atlanta, GA 30333). *Am. J. Trop. Med. Hyg.* 27(1): 106-112; 1978.

8329 SYMPOSIUM ON CARCINOMA OF COLON AND RECT 1. RESULTS OF STANDARD SURGICAL TREATME OF COLON AND RECTAL CARCINOMA. (Eng.) Peloquin, B. (Hopital Notre-Dame, 1560, rue Sherbrooke est, Montreal, Quebec H2L 4K8, Canada). *Can. J. Surg.* 21(1):39-42; 1978.

8330 SYMPOSIUM ON CARCINOMA OF COLON AND RECT 3. RADIATION THERAPY IN RECTAL CANCER. (Eng.) Cummings, B. J. (Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada). *Can. J. Surg.* 21(1):44-46; 1978.

8331 ADENOCARCINOMA OF THE LARGE INTESTINE IN YOUNG ADULTS. (Eng.) Vezzoni, P.; Clemente, C.; Gennari, L. (Istituto Nazionale per lo Studio e la Cura dei Tumori, Milan, Italy). *Tumori* 63(6):565-573; 1977.

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8333 A NEW TREATMENT OF ANAL INCONTINENCE IN CHILDREN: FREE AUTOGENOUS MUSCLE TRANSPLANTATION. (Eng.) Hakelius, L.; Gierup, J.; Grotte, G.; Jorulf, H. (Univ. Hosp., Uppsala, Sweden). *J. Pediatr. Surg.* 13(1):77-82; 1978.

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pt. Surgery, Univ. Witwatersrand, Johannesburg,
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land). *J. Urol.* 118(5):847-848; 1977.

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v. Hosp., Manhasset, NY). *Surg. Gynecol. Obstet.*
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ct. 13(2):150-151; 1978.

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e, L. (Long Island Jewish-Hillside Medical
ter, New Hyde Park, NY). *Surg. Gynecol. Obstet.*
(3):439-440; 1978.

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e's Hosp., Guildford, Surrey, England). *Histo-*
hology 1(1):77-84; 1977.

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, NY). *J. Pediatr. Surg.* 13(1):83-85; 1978.

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8358 COLONOSCOPIC POLYPECTOMY IN A PRESCHOOL-AGE CHILD. (Eng.) Ricotti, C. A.; Schuman, B. M. (Gastroenterology Clinic, 1622 E. Market St., Warren, OH 44483). *Henry Ford Hosp. Med. J.* 25(4):281-284; 1977.

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8370 INTESTINAL OBSTRUCTION FROM APPENDICEAL ABSCESS IN A NEWBORN INFANT. (Eng.) Golladay, E. S.; Roskes, S.; Donner, L.; Haller, A., Jr. (Johns Hopkins Univ. Sch. Medicine, Baltimore, MD 21205). *J. Pediatr. Surg.* 13(2):175-176 1978.

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II. FIBEROPTIC COLONOSCOPY AND POLYPECTOMY IN 15
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San Francisco Sch. Medicine, San Francisco, CA
94143). *Am. J. Gastroenterol.* 68(5):452-455; 1977.

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SYNDROME. (Eng.) Morgan, C. L., Jr.; Grossman,
I.; Novak, R. (Duke Univ. Medical Center, Box 3834,
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8380 URINARY TRACT COMPLICATIONS WITH RECTAL SURGERY. (Eng.) Beahrs, J. R.; Beahrs, O. H.; Beahrs, M. M.; Leary, F. J. (Mayo Clinic, 200 First St. SW, Rochester, MN 55901). *Ann. Surg.* 187(5):542-548; 1978.

See also, 7979, 8128, 8140, 8147, 8148, 8150, 8160, 8166, 8169, 8180, 8200, 8201, 8248, 8287, 8382, 8386, 8395, 8403, 8409, 8439, 8564, 8566, 8572, 8575, 8596, 8601, 8602, 8603, 8606.

LARGE INTESTINE

Ulcerative Colitis

381 A RADIOLOGICAL AND PATHOLOGICAL CORRELATION OF THE MUCOSAL CHANGES IN ULCERATIVE
OLITIS. (Eng.) Bartram, C. I.; Walmsley, K.
St. Mark's Hosp., City Rd., London EC1V 2PS, Eng-
and). *Clin. Radiol.* 29(3):323-328; 1978.

he results of double-contrast barium enema (DCBE)
n 37 patients with ulcerative colitis were compared
ith the pathological appearance of resected colonic
pecimens from each of these patients to assess
he value of DCBE in this disease. DCBE was carried
ut without bowel preparation in 29 patients. Total
olitis was demonstrated macroscopically in 26 re-
ected specimens and histologically in 32. Radio-
ogical and pathological agreement of the extent of
he disease was present in 12 patients with total
olitis and in 5 patients with subtotal colitis.
n 20 patients, total colitis was diagnosed histo-
ogically, but radiologically the disease extended
roximally to the hepatic flexure in 8, to the
ransverse colon in 6, to the splenic flexure in 4,
nd to the descending colon in 2. The radiological
ppearance was placed into one of the following
ategories by two observers: granular fine (GF),
ranular coarse (GC), coarse surface irregularity
CSI), and mucosal excrescences (ME). The patho-
ogical appearance was graded according to the
ollowing categories: type 1, rough granular sur-
ace with no obvious defects; type 2, a similar
texture but with small surface defects; type 3, severe disruption of the surface due to ulceration; and type 4, the presence of mucosal tags. Observer agreement was present in 74% of the cases classified as GC and in 86% of cases classified as CSI; agreement was poor with GF and ME. Where observer agreement was present, the radiological and pathological classifications were well correlated. GF was associated with type 1 pathological appearance in 75%, GC with type 2 in 74%, and CSI with type 3 in 85%. With ME the numbers were too small for a valid conclusion. With qualifications, the DCBE without bowel preparation provides useful information as to the extent and severity of ulcerative colitis.

8382 LEUCOCYTE MIGRATION TEST WITH AUTOLOGOUS COLONIC MUCOSA AS ANTIGEN IN PATIENTS WITH ULCERATIVE COLITIS. (Eng.) Astrup, L.; Rasmussen, S. N.; Binder, V. (Frederiksberg Hosp., Ndr. Fasanvej 59, 2000 Copenhagen F, Denmark). *Scand. J. Gastroenterol.* 12(8):951-955; 1977.

The immunological parameters of ulcerative colitis (UC) were evaluated by the leukocyte migration agarose technique (LMAT, Clausen's technique) using the patient's own colonic mucosa as a possible antigen. To determine if a possible autohypersensitivity was specific to colonic mucosa, the results were compared with those obtained using autologous skin and buccal mucosa. The migration of peripheral WBC was studied in 16 untreated UC patients (5 inactive, 7 moderately active, 4 very active). Twelve patients with peptic ulcer, irritable colon, or hemorrhoidal tumors served as controls. The final concentration of protein in the three types of antigen solution was standardized to 100 μg/ml medium. The final concentration of WBC in the test solutions was 2.8×10^8/ml. The migration index (MI, ratio of area with antigen to the area without antigen) for UC patients and for controls was 1.02 ± 0.08 and 1.03 ± 0.13, resp., with rectal mucosa as antigen, 1.04 ± 0.08 and 1.07 ± 0.14, resp., with skin as antigen, and 0.98 ± 0.10 and 1.02 ± 0.09, resp., with buccal mucosa as antigen. The MI was considered to be within normal limits in all patients, regardless of the antigen used. No significant differences were demonstrated among the MI values. No correlation between the MI and the clinical activity of UC was demonstrated. The authors conclude that no antigen activity of autologous colon mucosa, buccal mucosa, or skin was demonstrable in UC by means of the LMAT but question whether the concentration of antigen used in the study was sufficient.

8383 FLUORESCENT ANTI-COLONIC AND E. coli ANTIBODIES IN ULCERATIVE COLITIS. (Eng.)

Marcussen, H. (Bispebjerg Hosp., Bispebjerg Bakke, 2400 NV, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 13(3):278-281; 1978.

To examine the possibility that *Escherichia coli* lipopolysaccharide (LPS) cross-reacting antigens induce autoimmunization to colon antigens in patients with ulcerative colitis (UC), the antigenic similarities between *E. coli* and colon mucosa from guenons and from rats were investigated and several *E. coli* serotypes were compared with each other antigenically using an indirect immunofluorescence technique. Sera from eight patients with UC yielded positive staining of goblet cells (4 with both antigens, 2 with guenon antigen only, and 2 with rat antigen only); sera from two patients were entirely negative, as were sera from five hospital controls. When the 10 patient sera were applied to agar preparations of 13 *E. coli* O group strains, there was 1 reaction with the O 1 serotype, 4 with the O 2 serotype, 3 with the O 8 serotype, and 5 with the O 14 serotype; there were 13 doubtful reactions between patient sera and 8 other *E. coli* O group serotypes. The only reactions among the control sera were two doubtful reactions, one each to serotypes O 8 and O 25. The fluorescent-staining activity of the seven patient sera that had reacted with *E. coli* antigens O 2, O 8, and O 14 was abolished by absorption with sediments of the corresponding bacteria. The strength of the immunofluorescence reaction was found to decrease as the sera were progressively diluted from 1:2 to 1:32. The results indicate that antigens from colon mucosa share antigenic determinants with some *E. coli* bacteria or bacterial components (possibly LPS).

8384 IgG MYELOMA PRESENTING AS ULCERATIVE COLITIS. (Eng.)

Haeney, M. R.; Ross, I. N.; Thompson, R. A.; Asquith, P. (East Birmingham Hosp., Birmingham B9 5ST, England). *J. Clin. Pathol.* 30(9):862-867; 1977.

To document the association of ulcerative colitis and myeloma, the cases of two elderly patients (a 63-yr-old man and a 61-yr-old woman) who presented with profuse bloody diarrhea and weight loss are discussed. Sigmoidoscopy revealed a uniformly edematous, hyperemic rectal mucosa with mucus and contact bleeding in the man and a granular, edematous rectal mucosa with mucopus and severe contact bleeding in the woman. Barium enema revealed loss of sigmoidal mucosal pattern, poorly distensible rectum, and increased rectosigmoid space in both patients. Rectal biopsies showed nonspecific proctitis, infiltration by lymphocytes and polymorphonuclear leukocytes, and morphologically normal plasma cells in the man and active nonspecific proctitis, increased cellularity and polymorphonuclear leukocytes in the lamina propria, early crypt abscess formation, and no evidence of amyloid in the woman. Bone marrow histology in the man revealed atypical plasma cells showing nuclear immaturity of which 18-20% were IgG-staining and <1% were IgA- or IgM-staining by immunofluorescence (IF) and in the woman it showed atypical plasma cells forming clumps of which 10% were IgG-staining by IF; the woman's plasma cells were multinucleate and pleomorphic with prominent nucleoli. Both patients had monoclonal IgG serum paraprotein with free light chains (kappa in the man, lambda in the woman) in th urine. Both patients were treated with salazopyrine and steroid retention enema for the ulcerative colitis. Cyclophosphamide and prednisolone therapy (varying doses)was initiated in the male patient, ar this therapy led to an improvement in both gastrointestinal disease and myeloma. Specific treatment for the myeloma was withheld in the second patient. Because the etiology of ulcerative colitis is unknown, it is difficult to assess the relation between it and IgG myeloma; the decreased resistanc to infection that occurs during IgG myeloma may increase the potential for invasion by hypothetical microorganisms. It is suggested that a diagnosis of myelomatosis should be considered in elderly patients presenting with ulcerative colitis.

8385 A CONTROLLED COMPARISON OF CORTICOTROPIN AND HYDROCORTISONE IN TREATMENT OF SEVERE PROCTOCOLITIS. (Eng.)

Powell-Tuck, J.; Bucknell, N. A.; Lennard-Jones, J. E. (St. Mark's Hosp., City Rd., London EC1V 2PS, England). *Scand. J. Gastroenterol.* 12(8):971-975; 1977.

The effectiveness of corticotropin (ACTH) and hydr cortisone in the treatment of severe proctocolitis was compared using parenteral doses of the drugs arranged to give similar blood cortisol levels.

ixteen patients with confirmed proctocolitis
ere studied in a 7-day trial. Seven patients
ere treated with one daily i.m. injection of 80
 of ACTH gel. Nine patients received a constant
nfusion of hydrocortisone hemisuccinate, 400 mg/
4 hr. Three patients receiving hydrocortisone
equired a reduction of dose because of side-effects.
he two groups were comparable regarding the ex-
ent, severity, and previous treatment of the dis-
ase. Ten patients had received prior treatment
ith oral steroids immediately before entering
he study (hydrocortisone, 6; ACTH, 4). Nine pa-
ients were discharged on medical treatment (hy-
rocortisone, 6; ACTH, 3), one had elective sur-
ery after a good response to hydrocortisone
reatment, and six required colectomy after show-
ng no improvement on medical treatment (hydro-
ortisone, 2; ACTH, 4). The mean length of hos-
ital stay was 30 days in the hydrocortisone
roup and 40 days in the ACTH group. The measured
lasma cortisol levels were comparable except
mmediately prior to ACTH injection, when the
evels in the ACTH patients were significantly
$p<0.01$) lower than in the hydrocortisone patients.
o correlation was found between the plasma
ortisol levels and the observed therapeutic re-
ponse. The higher incidence of side-effects
ith hydrocortisone treatment appeared to be
elated to the high sustained cortisol levels
ver the 24-hr period. Patients who had received
rior treatment with prednisolone immediately be-
ore entering the study had a lower response rate
5/10) to medical treatment than did those who
ad not been previously treated (5/6). Although
he results do not suggest a major advantage for
ither treatment, the trend favors corticosteroid
herapy over ACTH in the treatment of acute colitis.
he parenteral administration of a synthetic gluco-
orticoid such as prednisolone (60 mg equivalent
o 300 mg of hydrocortisone) may be the treatment
f choice.

86 INFLAMMATORY BOWEL DISEASE (ULCERATIVE COLITIS). (Eng.) Alpers, D.; Avioli,
 V. (Jewish Hosp. of Saint Louis, Saint Louis,
). *Arch. Intern. Med.* 138(2):286-291; 1978.

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ilding, Univ. Sydney, Sydney, New South Wales,
06, Australia). *Am. J. Hematol.* 4(1):79-85; 1978.

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w York, NY 10021). *Am. J. Roentgenol.* 130(5):
7-823; 1978.

89 THE SURGICAL ASPECTS OF CHRONIC MUCOSAL INFLAMMATORY BOWEL DISEASE (CHRONIC
CERATIVE COLITIS). (Eng.) Van Heerden, J. A.;
Ilrath, D. C.; Adson, M. A. (Mayo Clinic, 200 First St. SW, Rochester, MN 55901). *Ann. Surg.* 187(5):536-541; 1978.

8390 INFANTILE FACTORS IN TWO CASES OF ULCERATIVE COLITIS. (Eng.) Levitan, H. L. (Queen Elizabeth Hosp., Montreal, Quebec, Canada). *Int. J. Psychiatry Med.* 8(2):185-190; 1977/1978.

8391 INFLAMMATORY BOWEL DISEASE WITH SOME COMMENTS ON ULCERATIVE COLITIS. (Eng.) Cooke, W. T. (General Hosp., Birmingham, England). *Rend. Gastroenterol.* 9(3):218-227; 1977.

8392 IMMUNOLOGICAL ASPECTS OF ULCERATIVE COLITIS. (Spa.) Herrerias, J. M.; Perez Ruilopez, M. A.; Pellicer, F. J.; Olivan, J.; Sanchez Cousteau, J. A.; Garrido, M. (Hospital Universitario de Sevilla, Seville, Spain). *Rev. Esp. Enferm. Apar. Dig.* 50(4):409-418; 1977.

8393 IMMUNOLOGICAL ASPECTS OF ULCERATIVE RECTOCOLITIS. (Ita.) Luzi, G.; Pandolfi, F.; Paganelli, R.; Aiuti, F. (Istituto di Clinica Medica Generale e Terapia Medica III, Universita degli Studi, Rome, Italy). *Recent. Prog. Med. (Roma)* 63(3):213-227; 1977.

8394 IMMUNOPATHOGENESIS OF ULCERATIVE COLITIS. (Ger.) Gebbers, J. O.; Otto, H. F. (Institut fur Pathologie der Universitat, 2000 Hamburg 20, Martinistr. 52, W. Germany). *Dtsch. Med. Wochenschr.* 102(11):400-406; 1977.

8395 CHANGES IN FLUID-ELECTROLYTE METABOLISM IN INFLAMMATORY DISEASES OF THE LARGE INTESTINE. (Rus.) Oleinikov, P. N.; Levitan, M. Kh.; Ilysheva, G. N.; Brandina, A. M.; Kataeva, L. G. (Scientific Res. Lab. and Clinic Proctology, RSFSR Ministry of Public Health, Moscow, USSR). *Klin. Med. (Mosk.)* 55(2):61-66; 1977.

See also, 8140, 8143, 8167, 8180, 8266, 8304, 8348, 8349, 8376.

8396 THE ROLE OF CAERULEIN IN TESTS OF EXOCRINE PANCREATIC FUNCTION.

(Eng.) Cavallini, G.; Mirachian, R.; Angelini, G.; Vantini, I.; Vaona, B.; Bovo, P.; *et al.* (Clinica Medica III, Policlinico di Borgo Roma, Verona, Italy). *Scand. J. Gastroenterol.* 13(1):3-15; 1978.

The results of exocrine pancreatic function tests using rapid i.v. injection of secretin (1 clinical U/kg) plus cerulein (100 ng/kg) or cholecystokinin (1 or 2 Ivy Dog U/kg) were compared with those in which a continuous infusion was used. Sixty-three controls and 69 patients with chronic pancreatitis were placed in one of the above groups. Duodenal juice was collected for two and four 30-min periods in the subjects receiving the i.v. injection and the infusion, resp. Significant differences in volume secretion and bicarbonate and enzyme secretion were found in the patients as opposed to the controls at 30 min following the rapid i.v. injection of either secretin plus cerulein or secretin plus cholecystokinin. However, pancreatic stimulation was submaximal, and there was marked overlap between individual values of the parameters of pancreatic function in the patients and controls. Side-effects (diarrhea, upper right abdominal pain, and flushing) were noted in four patients who received secretin plus cerulein by i.v. injection. Better differentiation between normal and abnormal pancreatic function was provided by the continuous infusion of secretin and cerulein or secretin and cholecystokinin; the infusion of either combination produced similar results except in the case of volume. No side-effects were observed.

8397 PANCREATIC ASCITES.

(Fre.) Lienhard, P.; Hay, J. M.; Maillard, J. N. (Hopital Louis-Mourier, 92701 Colombes Cedex, France). *Chirurgie* 28(5):379-380, 383-384, 387-390; 1978.

The diagnosis and treatment of pancreatic ascites (defined as massive and recurring ascites occurring in the course of an isolated chronic pancreatitis) are discussed, and six cases are reported. Four of the patients had pseudocysts of the pancreas, and fluid was escaping into the peritoneal cavity as a result of rupture of the cyst. The pseudocysts were usually secondary to chronic pancreatitis in alcoholics (3/4 patients in this series). Two of these patients were treated by cystogastrotomy and two by splenopancreatectomy; a death caused by acute respiratory insufficiency 8 days postoperatively was the only treatment failure. The fifth patient had a small fistula on the head of the pancreas that developed after a partial gastrectomy for a duodenal ulcer; the pancreatic ascites was cured by insertion of an external drain (case does not fit the definition). The sixth patient had chronic pancreatitis attributed to alcoholism; however, no communication between the pancreas and the peritoneal cavity was seen at exploratory laparotomy. This patient did not have a recurrence of the ascites after the peritoneal cavity was drained a second time. The presence of chronic pancreatitis is not known in about 25% of patients with pancreatic ascites. Definitive diagnosis can be made by x-ray identification of the pseudocyst, presence of high levels of amylase in the ascitic fluid, and presence of bisalbumin in serum and ascitic fluid. Other treatment besides surgery may be the use of diuretics, steroids, antienzymes, and radiotherapy.

8398 ANGIOGRAPHIC EVALUATION OF GASTROINTESTINAL HAEMORRHAGE COMPLICATING PANCREATIC DISEASE.

(Eng.) Cosgrove, H.; Legge, D.; O'Connell, F. X.; Weir, D. (Mater Hosp., Dublin, Ireland). *Clin. Radiol.* 29(3):289-293; 1978.

The role of angiography in the management of gastrointestinal hemorrhage is discussed in relation to seven patients with gastroesophageal varices due to splenic or portal vein obstruction. Angiographic studies included celiac, superior mesenteric, splenic, and left gastric injections. In all cases, angiographic findings were confirmed at operation or at post-mortem examination. Five of the patients had pancreatitis and two had carcinoma. All but two of them had developed complications of pancreatic disease including pseudocyst, abscess, biliary obstruction, or pancreatic insufficiency. Such complications present a risk for the development of splenoportal hypertension and variceal bleeding. Five patients had occlusion or compression of the splenic vein and two had portal vein occlusion. Both patients with portal vein obstruction and two of those with splenic vein obstruction experienced acute and massive gastrointestinal bleeding. In three cases the bleeding resulted from the varices, and in one case, it resulted from tumor invasion into the duodenum. Endoscopic examination of two patients with splenic vein occlusion showed blood in the gastroesophageal region and excluded other causes of hemorrhage. One patient died; the other had a splenectomy based on angiographic demonstration of the source of the bleeding, and no further bleeding was experienced. In a patient with portal vein obstruction, endoscopy revealed blood in the pylorus of the stomach, and angiography showed that the source of the bleeding was the transverse pancreatic artery in the region of the head of the pancreas, due to mucosal erosion from carcinoma. The varices had not bled. Surgical resection of the duodenum and part of the tumor prevented further hemorrhage. The authors conclude that angiographic evaluation may be indicated in any patient with established or complicated pancreatic disease and that selective visceral angiography is essential for the proper management of these patients when gastrointestinal hemorrhage occurs.

8399 EVALUATION AND FOLLOW-UP OF PANCREATIC ARTERIOGRAMS. A NEW ROLE FOR ANGIOGRAPHY IN THE DIAGNOSIS OF CARCINOMA OF THE PANCREAS.

(Eng.) Herlinger, H.; Finlay, D. B. L. (St. James' Univ. Hosp., Leeds, England). *Clin. Radiol.* 29(3): 277-284; 1978.

The use of pancreatic angiography in the diagnosis

f pancreatic carcinoma was evaluated by examining
rteriograms for 103 patients (35 of whom had car-
inoma). There were three false-negative and seven
alse-positive diagnoses of carcinoma, giving an over-
ll accuracy rate of 90.3%. After reviewing the films
etrospectively, only one false-negative and one false-
ositive case could not be identified. Among the
ive periampullary carcinomas, the arteriogram
n one case presented as a small avascular area
ith only slight serpiginous encasement of sur-
ounding small vessels; another showed smooth en-
asement and displacement of the gastroduodenal
rtery without any other feature of carcinoma. In
wo other patients, the angiographic presentation
as similar to that seen in the cases of pancreatic
arcinoma. Pathological vessels were seen in at
east part of the tumor in all 30 cases of pan-
reatic carcinoma. Two carcinomas showed intense
umor blush. Serrated encasement occurred in 61%
f the 30 pancreatic carcinomas, smooth encasement
n 22%, and serpiginous encasement in 17%. The
mallest lesions detected by pancreatic arterio-
raphy were less than 2 cm in diameter; among
hese, one was found in the ampulla, one in the
ead/body region, and two in the tail of the pan-
reas. Since noninvasive imaging techniques are
ow available, angiographic diagnosis of pancreatic
arcinoma is often not required. The new purpose
f angiography in the diagnosis of pancreatic car-
inoma is the demonstration of small and still
urable lesions.

8400 THE PANCREAS AND IMMUNOGLOBULINS. III.
SECRETORY LEVELS OF IMMUNOGLOBULINS G, A,
IN PATIENTS WITH HYPERSECRETORY DISEASE, POST-
IDNEY TRANSPLANTATION AND PANCREATIC CARCINOMA. A
EW DIAGNOSTIC TEST. (Eng.) Soto, J. M.; Aufses,
. H., Jr.; Dreiling, D. A. (Mt. Sinai Sch. Medi-
ine, City Univ. New York, 100th St. and 5th
ve., New York, NY 10029). *Am. J. Gastroenterol.*
8(1):34-37; 1977.

he IgG, IgA, and IgM levels in pancreatic juice
ere investigated in three groups of patients to
etermine the diagnostic value of this parameter.
enal transplant patients (4) on immunosuppres-
ive drugs, patients with hypersecretory dis-
ase (7 with minimal pancreatitis and 7 with
ypersecretory pancreatic dysfunction of varying
tiology), and 9 patients with pancreatic carcin-
ma were tested and compared with 38 normal pa-
ients and 15 patients with chronic pancreatitis.
here were no significant differences between the
ormal controls and either the renal transplant
atients or the patients with hypersecretory dis-
ase. In patients with pancreatic carcinoma, IgA
as absent from pancreatic juice except for high
evels in patients with very early lesions and
rom whom juice was obtained directly from the
uct of Wirsung following secretin stimulation;
he data for IgG levels in these patients showed
catter, but the average level was markedly higher
han in any other group. The IgM level in carcin-
ma patients was not different from that in any
ther group. It is concluded that immunosuppres-
ive therapy does not alter the immunoglobulin
content of pancreatic juice, that hypersecretion does not dilute pancreatic immunoglobulin concentrations, and that the altered immunoglobulin profile in pancreatic carcinoma patients may constitute a new diagnostic test for pancreatic cancer.

8401 E.R.C.P. IN PANCREATIC DISEASE [Abstract]. (Eng.) Hadfield, A. (London Hosp., London, England). *Br. J. Radiol.* 51(601):66; 1978.

8402 PANCREATIC SCANNING [Abstract]. (Eng.) Testa, H. J.; Prescott, M.; Braganza, J. (Royal Infirmary, Manchester, England). *Br. J. Radiol.* 51(601):66; 1978.

8403 SUBCLINICAL RAT SOLUBLE VITAMIN DEFICIENCY IN TREATED PATIENTS WITH PANCREATIC INSUFFICIENCY [Abstract]. (Eng.) Dutta, S. K.; Costa, B. S.; Russell, R. M. (Veterans Admin. Hosp., Baltimore, MD). *Am. J. Clin. Nutr.* 31(4):707; 1978.

8404 SPLENIC EROSION AND HEMORRHAGE SECONDARY TO PANCREATIC PSEUDOCYST: A REVIEW OF THE LITERATURE AND ADDITIONAL CASE REPORT. (Eng.) Shafiroff, B. B.; Berkowitz, D.; Li, J. K.; Fletcher, P. (Montefiore Hosp. and Medical Center, Bronx, NY). *Am. J. Gastroenterol.* 68(2):145-153; 1977.

8405 ENVIRONMENTAL FACTORS AND DISEASES OF THE PANCREAS. (Eng.) Longnecker, D. S. (Dartmouth Medical Sch., Hanover, NH 03755). *Environ. Health Perspect.* 20:105-112; 1977.

8406 CIMETIDINE AS AN ADJUNCT TO ORAL ENZYMES IN THE TREATMENT OF MALABSORPTION DUE TO PANCREATIC INSUFFICIENCY. (Eng.) Regan, P. T.; Malagelada, J. R.; DiMagno, E. P.; Go, V. L. W. (Mayo Clinic, Rochester, MN). *Gastroenterology* 74(2, Part 2):468-469; 1978.

8407 PANEL: CANCER OF THE PANCREAS. (Eng.) Levin, B.; ReMine, W. H.; Hermann, R. E.; Schein, P. S.; Cohn, I., Jr. (Dept. Medicine, Univ. Chicago, Chicago, IL). *Am. J. Surg.* 135(2):185-191; 1978.

8408 A CASE OF HETEROTOPIC PANCREAS IN LYMPH NODE. (Eng.) Murayama, H.; Kikuchi, M.; Imai, T.; Yamamoto, Y.; Iwata, Y. (Fukuoka Univ., Sch. Medicine, 34 Nanakuma, Nishi-ku, Fukuoka 814, Japan). *Virchows Arch.* [*Pathol. Anat.*] 377(2):175-179; 1978.

8409 CYSTIC FIBROSIS PRESENTING WITH THE MECONIUM PLUG SYNDROME. (Eng.) Rosenstein, B. J. (Johns Hopkins Hosp., Park 2, 601 N. Broadway, Baltimore, MD 21205). *Am. J. Dis. Child.* 132(2):167-169; 1978.

8410 Salmonella typhimurium PANCREATIC ABSCESS: REPORT OF A CASE. (Eng.) Strand, C. L.; Sanders, S. L. (Crawford W. Long Memorial Hosp., Atlanta, GA 30308). *Am. Surg.* 44(3):174-176; 1978.

8411 PANCREATIC ARTERIOGRAPHY [Abstract]. (Eng.) Finlay, D.; Herlinger, H. (St. James' Hosp., Leeds LS9 7TF, England). *Br. J. Radiol.* 51(601):65-66; 1978.

See also, 8128, 8140, 8149, 8154, 8158, 8159, 816
8174, 8201, 8305, 8416, 8437, 8533.

PANCREAS

Pancreatitis

8412 STUDY OF THE PRINCIPAL PANCREATIC DUCT BY SONOGRAPHY. (Fre.) Pietri, H.; Palasciano, G.; Aimino, R.; Serafino, X. (Institut J. Paoli I. Calmettes, 232 bd de Sainte Marguerite, F 13273 Marseille Cedex 2, France). *Nouv. Presse Med.* 7(2):113-115; 1978.

A new technique is described for visualizing a dilated main pancreatic duct (Wirsung's canal) by ultrasound. The transducer must be used with a sweep motion in only one direction while positive pressure is exerted on the epigastrium. On a transverse section, the duct appears spindle shaped. It is in the shape of a circle 4 mm to 2 cm in diameter in the center of the pancreas on sagittal section. The method visualized the duct in 4/10 patients with chronic pancreatitis, whereas former methods successfully visualized the duct in 20/140 patients with dilated ducts.

8413 PARENTERAL NUTRITION IN THE TREATMENT OF ACUTE PANCREATITIS: EFFECT ON COMPLICATIONS AND MORTALITY. (Eng.) Goodgame, J. T.; Fischer, J. E. (Natl. Cancer Inst., Natl. Inst. Health, Bethesda, MD 20014). *Ann. Surg.* 186(5):651-658; 1977.

Clinical characteristics of 46 patients with acute pancreatitis treated with total parenteral nutrition (TPN) were examined. The duration of TPN varied from 5 to 90 days, with an average of 28 days. TPN was discontinued after p.o. intake was adequate in 33 of the 46 patients. Five patients were hyperalimented until their death, and TPN was discontinued in two patients when hope for their recovery was lost. TPN was discontinued in six patients because of complications directly related to this treatment modality. Episodes of catheter-related sepsis prompted discontinuation in five patients, while an inability to control rising serum potassium was the reason for discontinuance in the remaining patient. Despite the 15% incidence of acute renal failure, there were only four episodes of metabolic abnormalities that required discontinuation of TPN. Initial glucose intolerance was common (25%), but was usually controlled by temporarily reducing th infusion rate or by incorporating small amounts (10-20 U) of regular insulin to the infusion mixture. There were two episodes of protein intolerance, one occurring in a patient with a portacaval shunt and the other in a patient with persistent bacteremia. Hypocalcemia occurred in seven patients. Twenty-two patients experienced no complications after definitive therapy of their acute attack of pancreatitis, although 18 required surgery. Cardiovascular complications were the most frequent, followed by respiratory insufficiency, renal insufficiency, metabolic abnormalities, surgical complications, and bleeding dyscrasia. The major hyperalimentation related morbidity involved episodes of catheter sepsis, which occurred in 8 of 99 catheterizations. Nine deaths occurred in this series. Twelve of 15 patients who were critically ill with nonfunctioning gastrointestinal tracts survived, which supports the opinion that the maintenance of nutritional integrity in the absence of a completely functional gastrointestinal trac and in the presence of severe illness is essential. It is concluded that TPN should be seen as a method of support and not as a primary therapy in acute pancreatitis.

8414 GLUCAGON IN THE TREATMENT OF ACUTE PANCREATITIS. (Ita.) Quaranta, L.; Segr D.; Balestrino, E.; Beltrutti, D. (Ospedale Civi "S. Croce," Cuneo, Italy). *Gaz. Med. Ital.* 136(369-376; 1977.

A description of acute pancreatitis is given uti izing published accounts, and data on 25 new cas are presented to emphasize the role of glucagon treating this disease. Patients were given 1 mg of glucagon every 6 hr in continuous infusion i physiological solution. Treatment was continue

r 2-3 days after normalization of serum and
ine amylase values. Patients were also given
)00,000 IU Trasylol/day. There was a rapid
crease in amylasemia in all of the patients.
e blood glucose values showed that the patients
lerated the therapy very well. The serum calcium
vels oscillated between 8 and 9 mg%. The re-
lts, when compared with previous studies in
ich patients were not treated with glucagon,
ow that the pharmacological regimen reported in
is paper brings about a more rapid remission of
e acute phase of the disease, presumably by
ocking edema and impeding the development of
crosis and hemorrhage.

15 PROSPECTIVE STUDIES ON THE SIGNIFICANCE OF PROTEINASE INHIBITORS AND GLUCAGON IN
JTE PANCREATITIS.

(Ger.) Kirsch, A.; Werner,
; Heinze, D. (Chirurgische Klinik, Stadtisches
ankenhaus im Friedrichshain, DDR-1017 Berlin,
ninallee 49, E. Germany). *Zentralbl. Chir.* 108
):291-303; 1978.

e therapeutic effectiveness of glucagon and the
oteinase inhibitor Contrykal was studied in a
ndomized series of 403 patients with acute pan-
eatitis. All patients received basic therapy
nsisting of permanent gastric suction, plasma
fusion, and analgesia with procaine. Patients
ceiving Contrykal also received atropine. Mild
ncreatitis was diagnosed in 79 cases, medium-
gree pancreatitis in 198, and severe pancreati-
s in 126. Seventy-five randomly selected pa-
ents were treated with Contrykal (60,000-150,000
while 75 controls received basic therapy only.
ere were 10 recurrences, 1 pseudocyst, and 1
ychosis in the control group, while there were 5
currences, 1 pseudocyst, 2 psychoses, and 1 pan-
eatic abscess in the Contrykal-treated group.
e average duration of plasma infusion was 60.5 hr
thout Contrykal and 77.3 hr with Contrykal.
e average duration of the hospital stay was 12.8
ys without Contrykal and 13.6 days with Contrykal.
venty-five patients received glucagon (10 mg/day
v.) in addition to the basic therapy and 75
ntrols received basic therapy only. In the
ucagon-treated group, six patients developed
currences, four psychoses, three abscesses, and
e a pseudocyst. In the control group, five pa-
ents developed recurrences, three psychoses, two
eudocysts, and one abscess. The average length of
asma infusion was 72.1 hr in the treated pa-
ents versus 65.8 hr in the controls; the average
ngth of the hospital stay was 18.9 days in the
eated group versus 14.7 days in the controls.
e remaining group of 103 patients received basic
erapy only; 2 developed pseudocysts and 2 psy-
oses. The average duration of hospital treat-
nt was 14.7 days, the average duration of in-
sion 67.4 hr. The findings suggest that the re-
lts were best in the groups receiving the basic
erapy only.

16 INTRASPLENIC PANCREATIC PSEUDOCYST COMPLICATING SEVERE ACUTE PANCREATITIS.

(Eng.) Hastings, O. M.; Jain, K. M.; Khademi, M.; Lazaro, E. J. (Martland Hosp., 65 Bergen St., Newark, NH 07107). *Am. J. Gastroenterol.* 69(2):182-186; 1978.

A case of intrasplenic pancreatic pseudocyst complicating severe acute pancreatitis is presented. The patient was a 27-yr-old alcoholic man who presented with a 4-week history of upper abdominal pain, malaise, and dyspnea. The abdomen was distended and tender, and a poorly defined epigastric mass was palpated. A left-sided pleural effusion was present, necessitating thoracocentesis and subsequent thoracostomy. The patient's clinical condition failed to improve with conservative therapy, and exploratory laparotomy was carried out. At celiotomy, a large, thin-walled cyst, involving the distal half of the pancreas and in juxtaposition to the stomach, was encountered. Because of the immaturity of the cyst wall, external drainage was performed. Cyst fluid cultures grew beta hemolytic streptococci. A postoperative upper gastrointestinal series demonstrated extrinsic pressure on the stomach, and a selective celiac arteriogram, carried out 21 days postoperatively, revealed an avascular area of the spleen. At re-exploration 6 weeks after the initial operation, the angiographic avascular area was found to be a cystic mass, which had an amylase content of 733 Conway U. The spleen was enlarged, and splenectomy was performed. Histopathology of the spleen was unremarkable, and the cyst wall showed a nonepithelial lining with chronic inflammatory changes. Early surgical intervention with splenectomy and possibly caudal pancreatectomy is advocated in cases of intrasplenic pancreatic pseudocyst.

8417 ACUTE PANCREATITIS TREATED WITH AND WITHOUT ADDITION OF INSULIN.

(Eng.) Hallberg, D. (Karolinska sjukhuset and Serafimerlasarettet, Stockholm, Sweden). *Acta Chir. Scand.* 143(7/8):451-456; 1977.

Two treatment modalities for acute pancreatitis were compared retrospectively by reviewing 365 case histories from a 5-yr period. One modality involved well-supervised conservative treatment with gastric drainage, fluid and electrolytes given i.v., pain sedatives, and anticholinergic drugs; 165 patients were treated 222 times in this way. The second modality added insulin (20-40 IU/1,000 ml of glucose solution, infused i.v. as needed) to the first regimen; 258 patients were treated 408 times in this way. There were 58 patients treated in both ways at different times; 2 of them died while on treatment without insulin. Among 200 patients treated only once with insulin, 44 were treated during a recurrence (none died) and of the other 156, 5 died. Among 107 patients treated without insulin, 10 died and 9 had recurrences among whom 1 died. Thus, the mortality among the 258 subjects treated with insulin at least once was 1.9%, whereas the mortality among the 165 subjects treated without insulin was 7.9% (if the mortality rates are calculated per hospital admission, they are 1.2% among 408 and 5.9% among 272, resp.). These differences are statistically significant ($p<0.05$). There were no other significant differences between the two groups; age and sex distribution, positive information of gallstone disease or pancreatitis in 0-10 yr after biliary surgery, positive information of alcohol abuse, serum Ca levels, percentage of serious cases, kinds of surgical intervention, or length of hospital stay were the factors examined. The results support a pathogenetic concept for acute pancreatitis that is based on the incorrect activation of cyclic AMP in abdominal organs, leading to enhanced lipolysis, decreased splanchnic blood flow, pain, accumulation of free fatty acids in the splanchnic adipose tissue, hypocalcemia, and fat necrosis in the abdominal adipose tissue. The insulin plus glucose treatment is believed to inhibit or decrease lipolysis and increase splanchnic blood flow and so reverse the postulated series of events that constitute acute pancreatitis.

8418 DISCUSSION: PERSONAL EXPERIENCE WITH ACUTE PANCREATITIS. (Fre.) Leger, L.; Chiche, B.; Ghouti, A. (No affiliation given). *Chirurgie* 103(9):846-847; 1977.

8419 LAPAROSCOPIC STUDY OF THE CHRONIC EVOLUTION OF ACUTE PANCREATITIS. (Ita.) Berengo, A.; de Lalla, F. (Istituto di Malattie Infettive, Universita di Milano, Milan, Italy). *Minerva Dietol. Gastroenterol.* 23(2):103-105; 1977.

8420 ACUTE PANCREATITIS IN PREGNANT WOMEN. (Ukr.) Fedorchenko, V. M. (Kremenchug Obstetrical Ward, Poltava Oblast, Kremenchug, USSR). *Pediatr. Akush. Ginekol.* (4):59-61; 1977.

8421 ACUTE PANCREATITIS AND ITS TREATMENT. (Nor.) Amundsen, N. (Narvik sykehus, Kirurgisk avdeling, Narvik, Norway). *Tidsskr. Nor. Laegeforen.* 97(27):1398-1399; 1977.

8422 TREATMENT OF ACUTE PANCREATITIS. (Fre.) Roy, B.; Pouyat, X. (No affiliation given). *Chirurgie* 103(9):851-853; 1977.

8423 SURGICAL MANAGEMENT OF ACUTE PANCREATITIS. (Fre.) Gautier-Benoit, C.; Hodin, E.; Demonchy (No affiliation given). *Chirurgie* 103(9):862-863; 1977.

8424 SURGICAL TREATMENT OF ACUTE PANCREATITIS. (Ger.) Heberer, G.; Schildberg, F. W. (Chirurgische Klinik der Universitat, Nussbaumstr. 20, D-8000 Munich 2, W. Germany). *Munch. Med. Wochenschr.* 120(2/3):55-56; 1978.

8425 EARLY SURGERY IN SERIOUS ACUTE PANCREATITIS: REPORT OF A SERIES OF 100 CASES. (Fre.) Mercadier, M. (No affiliation given). *Chirurgie* 103(9):835-845; 1977.

8426 INDICATIONS AND RESULTS OF TOTAL PANCREATECTOMY IN THE TREATMENT OF ACUTE NECROTIZING PANCREATITIS. (Fre.) Alexandre, J. H. Camilleri, J. P.; Assan, R.; Guerrieri, M. T.; Bonan, A. (Hopital Broussais, 96, rue Didot, 75014 Paris, France). *Chirurgie* 103(9):858-861; 1977.

8427 COMBINATION OF SCINTIGRAPHY AND ULTRASONIC TOMOGRAPHY IN CHRONIC PANCREATITIS (Ger.) Benz, U. F.; Muller-Brand, J.; Gyr, K. (Universitatsinstitut fur medizinische Radiologie, Spitalstrasse 21, CH-4004 Basel, Switzerland). *Therapiewoche* 27(46):8283-8295, *passim;* 1977.

8428 ELIMINATION OF THE EXOCRINE FUNCTION OF THE PANCREAS IN CHRONIC PANCREATITIS. (Ger.) Mangold, G.; Kummerle, F. (Chirurgische Universitatsklinik, Langenbeckstr. 1, 6500 Mainz, W. Germany). *Dtsch. Med. Wochenschr.* 102(52):1926-1927; 1977.

8429 DYNAMIC CHANGES IN VARIOUS COMPONENTS OF THE KININ SYSTEM OF THE BLOOD IN CHRONIC PANCREATITIS. (Rus.) Orlov, V. A.; Beliakov, N. V.; Kuznetsov, V. A. (Clinical Hosp. No. 20, Moscow, USSR). *Ter. Arkh.* 49(12):82-84; 1977.

8430 TREATMENT OF PATIENTS WITH CHRONIC PANCREATITIS AT THE ESSENTUKI HEALTH RESOR (Rus.) Suveiev, I. M.; Babicheva, G. D.; Netesa, E. Ia. (Essentuki Health Resort, USSR Ministry Defense, Essentuki, USSR). *Vrach. Delo* (6):80-82 1977.

8431 RESECTION PROCEDURE OR SPLANCHNICECTOMY CHRONIC PANCREATITIS: INDICATIONS AND COMPARATIVE RESULTS. (Ger.) Vossschulte, K.; Scheld, H. (Chirurgische Universitatsklinik, Klinikstr. 29, D-6300 Giessen, W. Germany). *Munch. Med. Wochenschr.* 119(41):1325-1328; 1977.

8432 PANCREATITIS--A RARE COMPLICATION OF TYPHUS ABDOMINALIS. (Rus.) Borisova, M. A.; Krylova, A. M.; Rybka, I. N.; Prudnikov, A.; Solomashchenko, B. S. (Dept. Infectious Diseases, Crimean Medical Inst., Simferopol, USSR). *Vrach. Delo* (9):140-142; 1977.

8433 DIAGNOSTIC AND PHYSIOPATHOLOGIC ASPECTS OF BILIARY PANCREATITIS. (Fre.) Delcourt, A.; Jadot, R. (Rue des Bollandistes 5, 10 Brussels, Belgium). *Rev. Fr. Gastroenterol.* (13 68; 1977.

8434 FAMILIAL PANCREATITIS IN HYPERLIPOPROTEINEMIA. (Hun.) Schmidt, I.; Bruncs A.; Farago, F. (Bacs-Kiskun megyei Tanacs Korhaz Kecskemet, Hungary). *Orv. Hetil.* 118(47):2845-2848; 1977.

435 OSTEOLYTIC LESIONS FOLLOWING TRAUMATIC
PANCREATITIS. (Eng.) Neuer, F. S.;
berts, F. F.; McCarthy, V. (St. Luke's Hosp.,
nsas City, MO). *Am. J. Dis. Child.* 131(7):738-
0; 1977.

436 PANCREATIC NECROSIS IN A 3-YEAR-OLD-
CHILD. (Rus.) Khodov, S. M. (Dept.
diatric Surgery, Vladivostok Medical Inst.,
adivostok, USSR). *Vestn. Khir.* 119(7):98-99;
77.

437 GASTROSCOPIC DIAGNOSIS OF PANCREATIC
PSEUDOCYST RUPTURED INTO THE STOMACH.
er.) Bretholz, A.; Frey, P.; Lammli, J.; Corrodi, P.; Knoblauch, M. (Kantonsspital Zurich, Zurich, Switzerland). *Z. Gastroenterol.* 15(10): 638-639; 1977.

See also, 8140, 8154, 8157, 8158, 8170, 8313, 8396, 8397, 8400, 8401, 8405, 8595.

LIVER AND BILIARY TRACT

38 STUDY OF THE LIVER BY COMPUTERIZED
TOMOGRAPHY. EVALUATION OF ONE YEAR'S
PERIENCE WITH 1,480 INVESTIGATIONS. (Fre.)
teaux, M.; Coenen, H.; Struyven, J.; Marchal, G.;
venne, R.; Jeanmart, L.; *et al.* (Departement de
mographie Computee, Universite Libre de Bruxelles,
rue Heger-Bordet, 1000 Brussels, Belgium). *J.
diol. Electrol. Med. Nucl.* 58(12):765-772; 1977.

critical analysis of the use of computerized
mography (Delta Scanner: Ohio Nuclear) in the
agnosis of liver pathology is presented based on
udy of 1,480 patients. Initially, two studies
re performed, one before and one after i.v. injec-
on of contrast product (100 ml methylglucamine
atrizoate). The tomography without contrast was
ne to avoid masking a hypervascular lesion, but
is situation was not encountered, and only the
ntrast study was done later in the series. The
ecific pathology for 520 patients was hepatomegaly
85, cirrhosis in 50, steatosis in 5, abscess in
, hematoma in 3, ascites in 22, cystic formations
13, biliary cysts in 7, hepatorenal polycystosis
2, primary tumor in 16, metastatic infiltrations
107, regional cancer infiltration of the liver in
hepatic artery aneurysm in 1, and gallbladder dis-
se (lithiasis) in 26. There were 12 false-positive
sults, attributed to images of feeble density.
the 50 false-negative results, 28 were metastases
small size and 16 were of diffuse pathology, par-
cularly lymphomatosis. Circumscribed pathology,
ether of tumoral, infectious, or traumatic origin,
s readily visualized. Diffuse lesions, on the other
nd, with the exception of hepatic steatosis, were
fficult to visualize by computerized tomography.

39 INVESTIGATIONS ON ALBUMIN EXCRETION OF
THE LIVER INTO THE BILE. II. DISC ELEC-
ROPHEROGRAMS OF DUODENAL BILE. (Ger.) Rogos, R.;
etzold, H. (Kreiskrankenhaus, Leipziger Str. 55,
DDR-74 Altenburg, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 38(1):27-32; 1978.

Forty-nine samples of A-bile, 45 samples of B-bile, and 60 samples of C-bile from patients with chronic active hepatitis, liver cirrhosis, atrophic gastritis, cholangitis, acute hepatitis, and irritable colon were studied by disc electrophoresis. Protein fractions that migrated to the cathode were found to be predominant. A typical albumin peak was found in 5/60 C-biles only. These findings show a substantial difference from the electropherogram of T-drain bile. The *in vitro* decomposition of albumin from T-drain bile by trypsin suggests that upon entry into the duodenum, the albumin is rapidly and completely decomposed by the excess amount of proteases present and that its decomposition is faster than that of globulins. Since the albumin metabolites are resorbed, this albumin is part of the endogenous protein reserve. The electrophoretic pattern of the duodenal bile proteins is superimposed by that of protein metabolites, and therefore it was not a reproducible diagnostic tool despite the use of a protease inhibitor in the preparation.

8440 TOTAL SERUM BILE SALTS IN LIVER DISEASES. (Ita.) Annoni, G.; Barbi, G.; Del Ninno, E.; Ideo, G. (Istituto di Clinica Medica III dell' Universita di Milano, Milano, Italy). *Minerva Dietol Gastroenterol.* 23(2):59-65; 1977.

The usefulness of total serum bile salts as an index of liver disease was determined in 117 patients with hepatopathy and possible correlations between this measurement and other common indices of hepatic function were sought. Twelve patients had acute hepatitis, 20 chronic hepatitis, 35 chronic active hepatitis, 35 chronic active hepatitis with cirrhosis, and 15 inactive cirrhosis. All five groups of patients had significantly raised average serum levels of total serum bile salts in comparison with healthy individuals ($p<0.001$). The coefficient of correlation between bile salt levels and BSP level was highly significant: $p<0.05$ for chronic hepatitis and $p<0.001$ for chronic active hepatitis with or without cirrhosis and for inactive cirrhosis. The results of a meal test showed that the patients with hepatopathy had a notably augmented level of bile salts. The results show that total serum bile salts represent a highly sensitive index of cholestasis and that the meal test best demonstrates the presence of hepatopathy.

8441 DETERMINATION OF HUMAN LIVER CYTOCHROME P-450 BY A MICROMETHOD USING ELECTRON PARAMAGNETIC RESONANCE: STUDY OF 141 LIVER BIOPSIES.

(Fre.) Gabrielle, L.; Leterrier, F.; Molinie, C.; Essioux, H.; Cristau, P.; Laverdant, C. (Centre de Recherches du Service de Sante des Armees, 1 bis, rue du Lieutenant-Raoul-Batany, F92141 Clamart, France). *Gastroenterol. Clin. Biol.* 1(10):775-782; 1977.

A micromethod is described for the measurement of the level of cytochrome P-450 in human liver needle biopsies, and the results of such determination in 141 specimens are given. The specimens were obtained from 33 patients with histologically normal livers, 31 patients with bilharziosis but functionally normal livers, 19 with viral hepatitis with symptoms of at least 3 months duration, 3 with extrahepatic cholestasis, 38 with alcohol-induced fatty degeneration of the liver, and 15 with cirrhosis confirmed by histological examination. The method measures the electron spin resonance (ESR) of whole liver samples (3-20 mg) frozen in liquid nitrogen and the amplitude of the P-450 $g=2.27$ line; it was first tested on liver samples from Sprague-Dawley rats. Calibration of the ESR values for cytochrome P-450 in rat liver was established by comparing the observed values with those obtained by absorption spectrophotometry. The normal value for P-450 level established for patients without liver pathology was 43 ± 20 nmol/g liver. Patients with viral hepatitis with signs of recovery had values of 39.3 ± 21 nmol/g. Patients with persistant or active viral hepatitis had markedly decreased cytochrome P-450 values (4.3 ± 5.7 nmol/g). The patients with fatty liver degeneration had values of 43.9 ± 22.7 nmol/g, whereas the patients with alcoholic cirrhosis had values of 14.7 ± 17.4 nmol/g. The three patients with extrahepatic cholestasis had values of 73.8, 33.3, and 20.5 nmol/g, resp. This method permits determination of the liver enzyme cytochrome P-450 using very small liver samples (3-5 mg) that can be obtained by needle biopsy.

8442 BILE LYSOSOMAL ENZYMES; CHARACTERISTICS AND PATHOLOGICAL SIGNIFICANCE FOR VARIOUS HEPATOBILIARY DISORDERS.

(Eng.) Toyoda, S.; Eto, Y.; Aoki, K. (Tokyo Jikei Univ. Sch. Medicine, Nishishinbashi, Minato-ku, Tokyo, Japan). *Clin. Chim. Acta* 79(2):291-298; 1977.

The presence of several glycosidases in human bile was established in 25 patients, and their pathological significance in various hepatobiliary disorders was studied. The activities of β-galactosidase, β-glucosidase, and *N*-acetyl-β-glucosaminidase were demonstrated in the bile of seven normal subjects, using 4-methylumbelliferyl derivatives as substrates. The enzyme activities were increased 60- to 180-fold after the exclusion of bile salts and other small molecular compounds by Sephadex G-50 gel filtration. In patients with cholelithiasis, the mean activities of β-galactosidase and *N*-acetyl-β-glucosaminidase were significantly decreased ($p<0.01$). These activities were also significantly decreased in patients with acute hepatitis and liver cirrhosis ($p<0.01$). β-Galactosidase activity was within normal limits in one patient with gallbladder cancer, and that of β-glucosidase was near the upper limit in patients with bacterial cholangitis. Isoelectric focusing patterns of biliary glycosidases were similar for specimens from patients with hepatobiliary disorders as compared with normal individuals. This investigation presents firm evidence that lysosomal enzyme activities are present in bile.

8443 CHRONIC PATHOLOGY OF THE LIVER IN ITALY. COOPERATIVE RETROSPECTIVE STUDY.

(Ita.) Ascione, A.; Barcellona, R.; Benini, G.; Budillon, G.; Candalaresi, M. T.; Cataldi, V.; *et al.* (As- sociazione Italiana per lo Studio del Fegato, Naples, Italy). *Recent. Prog. Med. (Roma)* 63(5): 447-470; 1977.

The etiology, nosology, and socio-environmental f tors of chronic hepatopathies were studied retrospectively and compared to the incidence and loca tion of chronic hepatopathies in four regions of Italy (North, Central, South, and Sicily). Data were collected from 18 hospitals and university clinics on 5,055 cases of chronic hepatopathy observed in 1972-1974. The distribution of the cases was 2,522, 472, 1,614, and 447 in each of the 4 regions, resp. As percentages of the total cases in each region, resp., the incidence of cirrhosis (all types) was 58.3, 67.1, 57.3, and 71.9%; of primary carcinoma was 3.2, 4.2, 3.8, and 10%; of chronic aggressive hepatitis was 6.2, 8.0, 19.1, and 8.5%; of chronic persistent hepatitis was 4.1, 6.1, 5.9, and 3.5%; of noncirrhoti pathology due to alcohol was 21.5, 3.8, 3.1, and 0.7%; and of noncirrhotic pathology secondary to biliopathy was 1.7, 4.6, 5.4, and 0.7%. The differences among all four regions were statisticall significant ($p<0.05$) for alcoholic cirrhosis (No Central>South>Sicily) and for cryptogenic cirrho (Sicily>South>Central>North). Posthepatic cirrh and chronic aggressive hepatitis were significan more prevalent in the South ($p<0.05$), and hepato carcinoma was more prevalent in Sicily ($p<0.05$). Noncirrhotic pathology due to alcohol was significantly more prevalent in the North than in the Central or South regions ($p<0.05$) and signif icantly more prevalent in the latter two regions than in Sicily ($p<0.05$). When the incidences of various types of cirrhosis are compared with the total number of cases of cirrhosis, significant

($p<0.05$) regional differences were found for cryptogenic cirrhosis (Sicily>South>Central>North), for alcoholic cirrhosis (North>Central>South>Sicily), posthepatic cirrhosis (South>all other regions), and siderochromatosis (North>South, no cases in the other regions). Significant regional differences were found in the distribution of alcoholics and habitual drinkers versus moderate consumers and abstainers ($p<0.05$, North>Central>South>Sicily), in the percentage of female alcoholics (13.1% in the North, $p<0.05$), the percentage of female habitual drinkers (31.4% in the North and 32.2% in the central area, $p<0.01$), in the male/female ratio of the incidence of alcoholic cirrhosis (20.0% in Sicily, $p<0.01$), and in the incidence of primary carcinoma (5.3% in Sicily, $p<0.05$). Patients with hypocaloric diets had greater incidences of chronic hepatopathy than did those with hypercaloric diets. A greater number of people from the lower economic group had cirrhosis due to alcohol, idiopathic siderochromatosis, and noncirrhotic pathology due to alcohol than did those from the middle and upper income groups. Manual workers had a higher incidence of all types of chronic hepatopathy compared with persons in other types of occupations ($p<0.01$). This study is the first overview of the principal problems of chronic liver pathology with respect to geographic regions and of the role of alcohol in this pathology.

8444 LIVER COLLAGEN. (Fre.) Frey, J.; Bayle, J. J. (U.E.R. de Medecine, 30 rue Ferdinand Gambon, F 42100 Saint-Etienne, France). *Lyon Med.* 239(2):87-93; 1978.

Pathological conditions of the liver characterized by fibrosis are reviewed and discussed on the basis of current knowledge of normal collagen structure and metabolism. Three pathogenic mechanisms are considered: (1) modification of gene expression that determines the respective importance of type I and type II collagen, (2) increase in the activity of the enzymes of post-translational biosynthesis, and (3) decrease in collagenolytic activity. Methods of investigating alterations in collagen metabolism that may lead to diagnosis of liver pathology are discussed. These methods measure enzymes or metabolites in the blood and urine that reflect alterations in synthesis or degradation of collagen. The excretion of enzymes involved in collagen biosynthesis such as procollagen-prolylhydroxylase may be increased in hepatomas, and some authors have found an increase in blood and urine hydroxyproline, a collagen component, associated with the hepatic cirrhosis of chronic alcoholism.

8445 ALPHA-FETOPROTEIN: PART ONE OF GENERAL REVIEW. (Fre.) Delpre, G.; Gilat, T. (Hopital Beilinson, Petah Tikva, Israel). *Gastroenterol. Clin. Biol.* 2(1):87-106; 1978.

The literature on various techniques of measuring alpha-fetoprotein (AFP) in different areas of the body (serum, urine, cerebrospinal fluid, saliva) and the pathological conditions associated with high levels of serum AFP are reviewed. One table gives the limits of sensitivity of detection of AFP by 18 different methods, and another table gives the upper, median, and average values of serum AFP in the healthy subject as determined by radioimmunoassay and enzymatic immunoassay. The levels of AFP in the serum associated with primary and metastatic carcinoma of the liver are discussed; variations in AFP have been found in these patients according to age, sex, race, histological type of carcinoma, presence or absence of cirrhosis, size of tumor, and geographical locale of study. AFP levels found in other malignant tumors in adults (including teratoblastomas, embryonic tumors, and gonadal tumors) are discussed with respect to their diagnostic value. Literature on pathogenesis of elevated AFP levels in hepatic and other tumors is reviewed.

8446 GENERAL REVIEW: ALPHA-FETOPROTEIN. PART II. (Fre.) Delpre, G.; Gilat, T. (Beilinson Hosp., Petah Tikva, Israel). *Gastroenterol. Clin. Biol.* 2(2):193-214; 1978.

The literature concerning the involvement of alpha fetoprotein (AFP) in nonmalignant liver diseases (fulminant, acute, and chronic), in hepatocellular carcinoma (HCC) and its diagnosis, in diseases of children and neonates (malignant tumors, liver diseases, and metabolic and genetic diseases), in pregnancy, and in immunity is reviewed. In variou nonneoplastic liver diseases such as cirrhosis and hepatitis, the levels of serum AFP have been found to be useful indicators of the extent, progression, and reversal of the process. A definite relationship appears to exist between serum AFP and HBsAg levels i acute and chronic liver diseases that progress to HCC, although there is some controversy about this association and its application in differential diagnosis. There is also some controversy about the usefulness of markedly elevated serum AFP levels as an early indicator of HCC; the response of these AFP levels to chemotherapy and radiotherapy for HCC may be useful in indicating the efficacy of the therapy. In pediatric and neonatal liver diseases there seems to be a gap between the level of serum AFP in normal individuals compared with that in patients as in adults, but the serum AFP level does not aid the differential diagnosis of HCC from hepatitis as it does in adults. Serum AFP levels have been reported to be elevated in children and neonates with primary liver cancer, teratoma, acute viral hepatitis, congenital biliary atresia, in some chronic hepatopathies (such as infantile cirrhosis), and in some genetic and metabolic diseases, but the interpretation of serum AFP levels in these patients must be approached with caution and may depend on the age of the subject. The diagnostic significance of AFP levels in normal and abnormal pregnancies is discussed; the variation of AFP levels in the fetus, in maternal blood, and in amniotic fluid has a normal course, and deviations from these levels may indicate pathologies. AFP in immunity is discussed with respect to individual tolerance to autogenous AFP, ways in which this tolerance can be disrupted, and the role of AFP in immunosuppression.

8447 ALPHA-FETOPROTEIN IN THE DIAGNOSIS OF MALIGNANT NEOPLASMS.

(Ita.) Burke, P.; Bianco, L. (Istituto di Clinica Medica dell' Universita di Torino, Torino, Italy). *Minerva Dietol. Gastroenterol.* 23(2):91-94; 1977.

The incidence of alpha-fetoprotein (AFP) in 42 patients (21 patients had liver cirrhosis, 1 had acute viral hepatitis, 2 had chronic hepatitis, and 18 had various types of cancer) was determined by radial immunodiffusion and a modification of cross-over electrophoresis. Four of the patients had AFP in their sera (2 had primary hepatomas, 1 had metastasis of testicular teratocarcinoma, and 1 had hepatic cirrhosis). The quantitative values for AFP were 310 mg% ml and 230 mg% ml in the cases of primary hepatoma, 1 mg% ml in the case of testicular teratocarcinoma, and >0.7 μg/ml but <1 mg% ml in the case of hepatic cirrhosis. The results show that AFP serum levels are notably greater in cases of hepatoma than in other hepatopathy.

8448 A STUDY OF HEPATOCELLULAR CARCINOMA AMONG JAPANESE FROM THE POINT OF VIEW OF MORPHO-DEVELOPMENTAL PATHOLOGY--GROSS ANATOMICAL TYPES CLASSIFIED IN ITS RELATION TO CAPSULE FORMATION.

(Eng.) Nakashima, T.; Sakamoto, K. (Kurume Univ. Sch. Medicine, Kurume, 830, Japan). *Kurume Med. J.* 24(Suppl.)S43-S62; 1977.

One hundred seven necropsies and seven surgically resected livers were studied to develop a system for classifying hepatocellular carcinoma (HCC) with respect to capsule formation. In Japan, encapsulated HCC is frequent (60-70% of the cases), while elsewhere it is infrequent (e.g., 3.6% of the cases in Los Angeles). The classification parameters used were changes in the parenchyma and the growth pattern of the tumor. When classified by changes in the parenchyma, type A tumors are HCC unaccompanied by cirrhosis, and type B tumors are HCC accompanied by cirrhosis. Small HCC's were assigned to a separate class (type C) regardless of the presence or absence of cirrhosis, but in all 13 cases studied, advanced cirrhosis was present. Cirrhosis was present in 84/107 cases, hepatitis B surface antigen (HBsAg) was positive in 47.6% of the cases, and the overall male:female ratio was 6:1. Among type A patients, HBsAg was usually negative, and the sex ratio was 2.3:1. When classified by growth patterns, type I tumors were the infiltrating type (tumor cells infiltrating into the sinusoids and perisinusoidal areas of the adjacent liver parenchyma), type II tumors were the expanding type (tumor tissue forming a mass that expands as the tumor grows, compressing neighboring liver parenchyma that atrophies and disappears and a connective tissue capsule often forming at the boundary--encapsulated type), type III tumors were the multiple type (HCC metastasizing hematogenously at certain stages of growth, forming multiple separate lesions in the liver parenchyma), and type IV tumors were encapsulated HCC having additional infiltrative lesions or encapsulated HCC continuous with infiltrative lesions suggesting a transition. In the present classification, sclerosing HCC was included in the infiltrative type. Other systematic studies of HCC in Japan are described. T present classification was designed to meet the clinical demand for early diagnosis and early surgery in the treatment of HCC.

8449 ULTRASTRUCTURE OF THE LIVER IN HUMAN AMYLOIDOSIS.

(Eng.) Eguchi, T.; Fukud K.; Okugawa, N.; Tanikawa, K.; Kimura, N. (Kurume Univ. Sch. Medicine, Kurume, 830, Japan). *Kurume Med. J.* 24(4):229-235; 1977.

Liver biopsy specimens from two patients with primary amyloidosis were examined histologically and ultrastructurally. Histological examination revealed that amyloid deposits around vessels in the portal area were minimal in the first patient but extensive in the second. The basic lobular architecture was destroyed as a result of the amyloid deposits in the latter patient. Electron microscopy in the first patient showed minimal development of amyloid fibrils in the space of Di Fine amyloid fibrils in this area were arranged in parallel and measured approximately 50-125 A in width. Amyloid material was limited to the portal area. The cytoplasm of the hepatocytes a the bile canaliculus appeared normal. Extracellular spindle-shaped amyloid bundles were seen within invaginations of the plasma membrane of reticuloendothelial cells. Filamentous structure were also noted within the cell, although there was no continuity between extra- and intracellula filaments. In the second patient, hepatocytes appeared to be reduced in proportion to the exte of amyloid deposition. However, the lobular architecture remained normal in some areas, and in these areas a moderate degree of amyloid depo tion was noted in the space of Disse. The amylo deposit within the space of Disse seemed to spre toward the hepatocyte with resultant constrictio of the hepatocyte. No amyloid deposits were not within the hepatocyte, although the endoplasmic reticulum was vesiculated, and other organelles showed moderate changes. Hepatocytes disappeare in the vicinity of massive amyloid deposits. Ir regularly shaped reticuloendothelial cells with large nuclei were often found, and dense amyloid deposits were frequently observed between the cytoplasmic processes of these cells. There appeared to be continuity between extra- and intra cellular amyloid filaments. It appears that reticuloendothelial cells play an important role in amyloid production.

8450 LIVER DISEASE IN HOMOZYGOUS α_1-ANTI-TRYPSIN DEFICIENCY.

(Ger.) Karitzky, D.; Lesch, R.; Goedde, H. W.; Witt, I.; Boehm, N Beckmann, R.; *et al.* (Universitats-Kinderklinik, Mathildenstr. 1, 7800 Freiburg, W. Germany). *Dt Med. Wochenschr.* 103(4):161-166; 1978.

ntile liver disease was diagnosed in 5 of 12
dren with homozygous α_1-antitrypsin deficiency
-type Z). The course of the disease in these
ents was extremely variable. One of the five
ents died from liver cirrhosis at the age of
r. The clinical, biochemical, and (in 2 cases)
histological findings in the other four pa-
ts became normal over a follow-up period of
yr. The findings indicate that α_1-antitrypsin
ciency, even when associated with liver dis-
, need not have an unfavorable prognosis.

INTRAHEPATIC CYSTIC BILE DUCT DILATATIONS
AND STONE FORMATION: A NEW CASE OF CAR-
S DISEASE. (Eng.) Mathias, K.; Waldman, D.;
eler, G.; Kauffmann, G. (Universitats-Kliniken,
stetterstr. 55, D-7800, Freiburg, W. Germany).
Hepatogastroenterol. (Stuttg.) 25(1):30-34;
.

pathology, clinical signs, diagnosis, differ-
al diagnosis, therapy, and prognosis of Caroli's
ase are briefly reviewed, and a new case of the
ase is reported. Caroli's disease is a rare
lial anomaly with circumscribed saccular dila-
ons of enlarged intrahepatic bile ducts coated
egular or pseudopapillomatous epithelium and
be combined with additional malformations of
extrahepatic biliary tract as well as with
llary sponge kidney. Infection and stone
ation are frequent complications. Most pa-
ts complain of upper abdominal pain caused by
angitis and gallstones; liver abscesses and
icemia may also occur. Patients may therefore
ent with colic, fever, and icterus. Extra-
tic lithiasis occurs frequently. Diagnosis by
cholangiography (demonstrating the opacifi-
on of ectatic bile duct segments) easily over-
s Caroli's disease because the associated
ons are more remarkable; it is improved by
graphy. Other diagnostic methods include
a- or postoperative cholangiography, barium
ies, endoscopic retrograde cholangiography,
percutaneous transhepatic cholangiography.
ratory examinations are noncontributory, lap-
copy and laparotomy are unreliable, and liver
sy is contraindicated. Differentiation be-
n Caroli's disease and biliary cyst formation,
ructive cholangitis, biliary obstruction, poly-
ic liver disease, and solitary hepatic cysts
resented. Surgery is indicated if the disease
imited to one lobe (which should be resected)
f the disease is diffuse (papillotomy or
odigestive anastomosis may be useful). Gall-
e dissolution and prevention and antibiotics
important in symptomatic therapy. Caroli's
ase is often life-shortening; patients die
epticemia, cholangitis, liver abscess, chol-
ocellular carcinoma, relapsing cholangitis,
pancreatitis. A 31-yr-old woman with a sev-
-year history of upper abdominal pain, colic,
relapsing pancreatitis underwent cholecys-
omy and transduodenal papillotomy for cho-
iolithiasis, intrahepatic bile duct ectasia,
papillary sclerosis; also, all stones were
ved from the choledochal duct. Despite antibiotic therapy for cholangitis and chenodeoxycholic acid therapy (both by infusion through the T-drain and p.o.), cystic dilatations of the bile ducts and intrahepatic gallstones persist.

8452 INTRAHEPATIC PIGMENT STONES: AN ASIAN DISEASE DIAGNOSED WITH RETROGRADE CHOLANGIOGRAPHY. (Eng.) Johnson, L. F.; Walta, D. C. (Walter Reed Army Medical Center, Box 431, Washington, DC 20012). *Am. J. Dig. Dis.* 23(Suppl. 5):13s-18s; 1978.

The case of a patient with intrahepatic biliary pigment stones diagnosed by endoscopic retrograde cholangiography (ERC) is presented, and the authors' experience with this disease is reviewed. The patient, a 29-yr-old Oriental man, presented with recurrent pruritus and jaundice. At the first admission, the SGOT level was 217 IU, and the alkaline phosphatase level was 19.4 Bodansky U. A p.o. cholecystogram showed poor opacification and, at peritoneoscopy, hepatomegaly was noted, with a normal-appearing gallbladder. Liver biopsy showed pericentral cholestasis with triaditis and bridging of portal areas. An i.v. cholangiogram, performed after the resolution of jaundice, revealed normal common and cystic ducts. Hepatic biopsy was complicated by bleeding and prompted surgical intervention, which confirmed the large noncirrhotic liver, normal gallbladder, and normal common bile duct. The biopsy showed bile stasis, portal fibrosis, and mixed inflammatory infiltrate. Two years later, the patient's symptoms recurred, and biopsy revealed features compatible with extrahepatic obstruction. ERC at this time showed an obstruction proximal to the common hepatic duct bifurcation. Intrahepatic biliary radicles did not fill. Ten days later, a percutaneous hepatic cholangiogram failed to opacify any biliary duct despite a demonstrated obstruction on the retrograde cholangiogram. An operative cholangiogram showed a marked impaction of the intrahepatic biliary radicles with fine pigment stones and biliary sludge. A T-tube was placed in the common bile duct, and the patient subsequently received choleretic therapy with phenobarbital and Decholin. Jaundice disappeared, and the serum bile salt concentration dropped to 2.5 mg/100 ml. Fourteen months after the start of choleretic therapy, the biliary radicles were cleared by constant irrigation with a saline-heparin solution. The patient has been asymptomatic on choleretic therapy, although the serum bile salt level increased to 30 mg/100 ml after closing the T-tube tract. In the authors' experience, gallbladder, cystic, and common duct opacification at ERC without intrahepatic filling in the prone, head-down position denotes disease of the intrahepatic biliary radicles.

8453 A COMPUTER SIMULATION STUDY RELATING TO THE TREATMENT OF FULMINANT HEPATIC FAILURE BY HEMOPERFUSION. (Eng.) Berk, P. D. (Liver Unit, DDB:NIAMDD, Bldg. 10, Rm. 4D-52, Natl. Inst. Health, Bethesda, MD 20014). *Proc. Soc. Exp. Biol. Med.* 155(4):535-539; 1977.

Computer simulation techniques were used to investigate what schedule of charcoal hemoperfusion might more rapidly deplete the apparently critical slowly-exchanging extravascular pool of "toxin," which has been hypothesized to accumulate in fulminant hepatic failure and result in liver coma. In contrast to the hypothetical toxin, the internal kinetics of unconjugated bilirubin have been extensively studied, as has its rate of clearance from blood during hemoperfusion with an albumin-agarose "artificial liver" device. In addition, unconjugated bilirubin has an extrahepatic, extravascular pool that exchanges slowly with plasma at a rate not inconsistent with that which must also be obtained for the hypothetical toxin of fulminant hepatic failure. Accordingly, the effects of various albumin-agarose hemoperfusion treatment schedules on the rate of depletion of the extrahepatic extravascular pool of unconjugated albumin were studied. The extrahepatic, extravascular bilirubin pool in an 18-yr-old woman with type I Crigler-Najjar syndrome decreased by only 15% by the end of a 4-hr hemoperfusion period. Bilirubin content continued to fall after the completion of the perfusion; a nadir of 60% of baseline was reached at approximately 24 hr after initiation of the procedure, consistent with the time course of arousal of comatose patients with fulminant hepatic failure after charcoal hemoperfusion therapy. Analysis of the computer-simulated effects of four different treatment schedules (4 hr/day; 12 hr, then 4 hr/day; 24 hr, then 4 hr/day; and continuous) during a 5-day period showed that continuous hemoperfusion was the most efficient, reducing the plasma unconjugated bilirubin concentration to 1.2 mg% and the extrahepatic, extravascular bilirubin pool to values within the normal range by 24 hr. The usually employed 4-hr regimen did not achieve plasma bilirubin values consistently under 6 mg%, and did not bring the extravascular pool within the normal range until after the fourth treatment. Initial perfusions of either 12 or 24 hr, followed by maintenance treatments of 4 hr/day would achieve normalization of the extrahepatic, extravascular pool within 28 and 24 hr, resp., of initiating treatment. Alternatively, two perfusions of 6 hr each, at the start of treatment and at 12 hr would result in normalization of the extravascular pool by 30 hr. The results suggest that albumin-agarose hemoperfusion could reduce the plasma unconjugated bilirubin concentration substantially and the extrahepatic, extravascular bilirubin pool size to normal in patients with type I Crigler-Najjar syndrome. These results are dependent upon both the efficiency of the device and on the treatment schedule.

8454 HEPATITIS B SURFACE ANTIGEN AND α-FETOPROTEIN IN PATIENTS WITH HEPATOCELLULAR CARCINOMA [Letter to Editor]. (Eng.) Chen, D. S.; Sung, J. L.; Kubo, Y.; Okuda, K. (Coll. Medicine, Natl. Taiwan Univ., Taipei, Taiwan, 100, Republic of China). *Gastroenterology* 74(1):163-165; 1978.

8455 CELL MEDIATED IMMUNITY TO BILE PROTEIN IN THE PATIENTS WITH CHRONIC INTRAHEPATIC CHOLESTASIS, WITH SPECIAL REFERENCE TO PRIMARY BILIARY CIRRHOSIS [Abstract]. (Eng.) Sano, M.; Ito, K. (Sch. Medicine, Kyoto Univ., Kyoto, Japan). *Gastroenterol. Jpn.* 12(4):334; 1977.

8456 VOLATILE METABOLITES IN HEPATIC ENCEPHALOPATHY [Abstract]. (Eng.) Goldberg, E. M.; Wolman, S.; Sandler, S.; Blendis, L. M. (Dept. Medicine, Univ. Toronto, Toronto, Ontario, Canada). *Clin. Res.* 25(5):687A; 1977.

8457 RIGHT HEPATIC LOBECTOMY--7 CASES [Abstract]. (Eng.) Raute, M.; Kersting, K. H.; Trede, M. (Klinikum Mannheim der Universitat Heidelberg, Theodor-Kutzer-Ufer, D-6800 Mannheim, W. Germany). *Langenbecks Arch. Chir.* 395:583; 1977.

8458 POTENTIAL HAZARD OF THERAPY FOR REYE'S SYNDROME WITH UREA CYCLE INTERMEDIATES [Letter to Editor]. (Eng.) Glasgow, A. M. (Children's Hosp. Natl. Medical Center, 2125 13th St. N.W., Washington, DC 20009). *Pediatrics* 60(4):557-558; 1977.

8459 PLASMA AMINO ACID CHANGES AS A FUNCTION OF HEPATOCELLULAR DAMAGE [Abstract]. (Eng.) Milsom, J. P.; Morgan, M. Y.; Sherlock, S. (Royal Free Hosp., Pond St., Hampstead, London NW3 2QG, England). *Clin. Sci. Mol. Med.* 53(3):15P; 1977.

8460 SERUM FERRITIN IN THE DIAGNOSIS OF HEMOCHROMATOSIS [Abstract]. (Eng.) Powell, L. W.; Halliday, J. W.; Russo, A.; Cowlishaw, J. (Dept. Medicine, Univ. Queensland, Brisbane, Australia). *Gastroenterology* 73(5):1239; 1977.

8461 REPTILASE TIME IN CIRRHOSIS AND HEPATOCELLULAR CARCINOMA. (Eng.) Johnson, P. J.; White, Y.; Woolf, I. L.; Williams, R. (King's Coll. Hosp., Medical Sch., London SE5, England). *Br. Med. J.* 2(6091):869-870; 1977.

8462 CONGENITAL HEPATIC FIBROSIS AND CHOLEDOCHU CYST. (Eng.) Lake, D. N. W.; Smith, P. M.; Wheeler, M. H. (Llandough Hosp., Penarth, Cardiff, Wales). *Br. Med. J.* 2(6097):1259-1260; 1977.

8463 RADIOISOTOPE LIVER IMAGING [Abstract]. (Eng.) McCready, V. R. (Royal Marsden Hosp., Downs Rd., Sutton, Surrey, England). *Br. J. Radiol.* 51(601):64; 1978.

8464 PORTOVENOGRAPHY IN LIVER DISEASES [Abstract]. (Eng.) Ngan, H.; Wong, K. P. (Queen Mary Hosp., Hong Kong). *Br. J. Radiol.* 51(601):65; 1978.

465 THE VALUE OF HEPATIC ANGIOGRAPHY [Abstract]. (Eng.) Laws, J. W. (King's
ll. Hosp., Denmark Hill, London SE5, England).
. J. *Radiol.* 51(601):64-65; 1978.

466 COMPUTED TOMOGRAPHY OF THE LIVER [Abstract]. (Eng.) Fawcitt, R. A. (Dept.
agnostic Radiology, Univ. Manchester, Manchester,
gland). *Br. J. Radiol.* 51(601):64; 1978.

467 ULTRASOUND OF THE LIVER [Abstract]. (Eng.) Berger, L. A. (Royal Free Hosp.,
ndon, England). *Br. J. Radiol.* 51(601):64;
78.

468 THE USE OF PROFOUND HYPOTHERMIA AND CIRCULATORY ARREST FOR HEPATIC LOBECTOMY
 INFANCY. (Eng.) Ward, C. F.; Arkin, D. B.;
enumof, J. L. (Univ. California Medical Center,
25 W. Dickinson St., San Diego, CA 92103).
nesthesiology 47(5):473-474; 1977.

469 CEREBRO-HEPATO-RENAL SYNDROME: ALSO A DISTAL AXONOPATHY [Abstract]. (Eng.)
artin, J. S.; McAdams, A. J.; Berry, H.; Partin,
. C. (Children's Hosp. Medical Center, Univ.
incinnati, Cincinnati, OH). *Gastroenterology*
3(5):1238; 1977.

470 REGENERATION IN THE SIMPLE LIVER ACINUS AFTER SELECTIVE ZONAL INJURY [Abstract].
Eng.) Nostrant, T. T.; Miller, D. L.; Appelman,
. D.; Gumucio, J. J. (Section Gastroenterology,
niv. Michigan, Ann Arbor, MI). *Gastroenterology*
3(5):1236; 1977.

8471 BLOOD POLYAMINE DETERMINATIONS IN CHILDREN WITH LIVER DAMAGE [Abstract]. (Eng.) Garnica, A. D.; Rodgers, B. M.; Rennert, O. M. (Univ. Florida Coll. Medicine, Gainesville, FL). *Pediatr. Res.* 12(4, Part 2):434; 1978.

8472 HEPATIC LEFT LOBE LESIONS--CLINICAL USEFULNESS OF MULTIPLE IMAGING TECHNIQUES TO INCREASE LESION DETECTABILITY. (Eng.) Gooneratne, N. S.; Quinn, J. L., III (South Carolina Hosp., 171 Ashley Ave., Charleston, SC 29403). *Clin. Nucl. Med.* 2(11):377-380; 1977.

8473 CONGENITAL CYSTIC DISEASE OF THE LIVER: ISOTOPE SCANNING, ULTRASONOGRAPHY AND ANGIOGRAPHY. (Eng.) McLoughlin, M. J.; Miskin, M.; Thompson, C. P. (Toronto General Hosp., Toronto, Ontario, Canada). *J. Can. Assoc. Radiol.* 28(4):243-248; 1977.

8474 ACCUMULATION OF ^{99m}Tc-DIPHOSPHONATE IN HEPATIC NEOPLASM. (Eng.) Ghaed, N.; Marsden, R. J. (Fitzsimons Army Medical Center, Denver, CO). *Radiology* 126(1):192; 1977.

See also, 7989, 8071, 8140, 8144, 8145, 8170, 8174, 8243, 8251, 8288, 8434, 8484, 8488, 8519, 8520, 8561, 8591, 8599, 8601, 8602, 8603, 8604, 8605.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

475 PHYSIOLOGIC JAUNDICE OF THE NEWBORN: RELATION TO MATERNAL SERUM AND AMNIOTIC
LUID ALPHA-FETOPROTEIN. (Eng.) Goldstein, A.
.; Farrell, R. C. (Dept. Obstetrics and Gynecology,
niv. California, Irvine, CA 92717). *Obstet.*
ynecol. 51(3):315-317; 1978.

he relationship between physiologic jaundice of
he newborn and elevated levels of maternal serum
nd amniotic fluid alpha-fetoprotein was studied.
ighty-seven paired serum and amniotic fluid specimens taken between 37 and 41 weeks of pregnancy were evaluated. There was an excellent correlation between increased levels of maternal serum and amniotic fluid alpha-fetoprotein and physiologic indirect neonatal hyperbilirubinemia. The maternal serum alpha-fetoprotein levels at 37, 38, 39, 40, and 41 weeks were 384 ± 22, 324 ± 19, 310 ± 23, 272 ± 18, and 253 ± 12 ng/ml, resp., in cases where the neonatal serum bilirubin level was less than 7 mg/100 ml, whereas the values were 451 ± 26, 415 ± 22, 403 ± 16, 387 ± 19, and 344 ± 28 ng/ml in

cases where the neonatal bilirubin level was over 7 ng/100 ml. The amniotic fluid alpha-fetoprotein levels were 394 ± 32, 327 ± 29, 277 ± 26, 271 ± 18, and 258 ± 17 ng/ml in cases in which the bilirubin level was less than 7 ng/100 ml, whereas the levels were 692 ± 16, 681 ± 24, 630 ± 12, 586 ± 14, and 559 ± 17 ng/ml in cases of hyperbilirubinemia. The alpha-fetoprotein assay might be used as an index of fetal liver maturity when considering elective cesarean section or induction.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

8476 ANGIOGRAPHIC ABNORMALITIES AFTER PUNCH BIOPSY OF THE LIVER. (Fre.) Cremniter, D.; Chatel, A.; Bigot, J. M.; Lacombe, P.; Helenon, C. (Hopital Tenon, 4, rue de la Chine, 75970 Paris Cedex 20, France). *J. Radiol. Electrol. Med. Nucl.* 59(1):33-38; 1978.

Vascular abnormalities that developed in nine patients after puncture biopsies of the liver and in one patient after pleural biopsy were detected by angiography. An arterioportal fistula was the abnormality observed in seven patients; the fistula was usually small and disappeared spontaneously. Most often, these fistulas were found accidentally when patients underwent angiography for symptoms related to other pathology. Two patients had hematomas, one of which was associated with an arterioportal fistula. The patient who had a pleural puncture developed a false aneurysm of the distal branch of the hepatic artery and peritoneal hemorrhage. When this patient underwent surgery, a tear in the liver was found that was attributed to the pleural puncture biopsy. Arterioportal fistulas are observed in 60% of patients who undergo angiographic studies within 1 week of liver biopsy. They are rarely serious since they heal rapidly and spontaneously.

8477 DRUG-INDUCED HEPATIC DAMAGE. (Ger.) Keller, J. (Medizinische Universitatsklinik, Hugstetter Strasse 55, 7800 Freiburg, W. Germany). *Therapiewoche* 28(5):762-778, *passim*; 1978.

A review of drug-induced hepatic damage is presented. Drug-induced hepatic damage may be classified according to its clinical features, the histology of the damaged liver tissue, or the mechanism causing the damage. Drugs causing a predictable reaction include cytotoxic drugs with direct hepatotoxicity such as carbon tetrachloride. Drugs causing indirect hepatotoxicity may be cytotoxic or cholestatic, such as tetracycline, methotrexate, *Amanita phalloides*, anabolics, and contraceptives. Drugs that cause unpredictable damage are those that provoke allergic reactions, hyperergy, or metabolic disturbances; some examples are halothane, oxyphenisatin, chlorpromazine, and isonicotinolyhydrazide (INH). Reactions provoked by substances causing predictable damage are characterized by a brief interval between exposure and manifestation of hepatic damage, clear dose-dependence, experimental reproducibility, and nearly universal reaction by exposed persons. Reactions to drugs causing unpredictable damage are generally not dose-dependent and cause allergic hepatic damage or metabolic damage. Diagnostic characteristics of both types are given. A few drugs worthy of special note have been selected for comment; their use and capability for causing liver damage are explained. Among thes are halothane, paracetamol, INH, alpha-methyldopa, i.v. tetracycline, oral contraceptives, chlorpromazine, *N*-propyl ajmalin and derivatives, aprinidine azathioprine, methotrexate, and oxyphenisatin.

8478 A MORPHOLOGIC STUDY OF UNEXPLAINED HEPATITIS FOLLOWING HALOTHANE ANESTHESIA. (Eng.) Wills, E. J.; Walton, B. (Royal Prince Alfred Hosp., Missenden Rd., Camperdown, New South Wales 2050, Australia). *Am. J. Pathol.* 91(1):11-32; 1978.

Liver biopsy specimens from 16 patients who developed hepatitis following halothane anesthesia were examined histologically and ultrastructurally to determine whether the liver morphology could aid in the differential diagnosis between halothane hepatitis and acute viral hepatitis. Ten cases were fatal, although only seven patients died in hepatic failure. Necrosis was not in general disproportionately sever compared with the clinical and biochemical condition of these patients, in contrast with the observations of previous cases of halothane hepatiti However, two patients with clinically equivocal hepatitis had definite morphologic evidence of hepatic inflammation and necrosis. Necrosis tende to be spotty, but in subjects who died rapidly, confluent necrosis was more clearly delineated. Fatty infiltration was unimpressive. Large numbers of eosinophils were seen in two cases. Cholestasis was too varied in degree and localization to be of diagnostic value. Bile ducts were frequently infiltrated with neutrophils and there was often accompanying erosion of the

renchymal limiting plate by inflammatory
lls. Increased portal tract connective
ssue was sometimes as apparent as early
12 days after the onset of jaundice. Light
croscopy of biopsy specimens from three pa-
ents who died from unrelated conditions
en their liver disease was clinically improving
owed a mode of resolution similar to that
viral hepatitis. Bile pigment was seen
trastructurally in the parenchymal cells
th the usual attendant canalicular changes
jaundiced patients. Autophagic activity
hepatocytes and Kupffer cell abnormali-
es were present in some cases. Dilated rough
doplasmic reticulum was observed in most cases
d was the most conspicuous feature in specimens
tained within 14 days of the onset of jaundice.
all defects in the mitochondrial membrane were
served in one patient, and variations in mito-
ondrial size and shape, abnormalities of their
istae, and crystalline inclusions were striking
only one case. Thus, the results do not sup-
rt the contention that the mitochondria are
e most severely affected organelles in halothane
patitis. Since lipid vacuolation and a pre-
minantly centrilobular distribution of necrosis
e not classically described in fatal viral hepa-
tis, the presence of these features in some of
e present fatal cases was of some diagnostic
terest. In general, however, the light and elec-
on microscopic features in patients with unex-
ained postoperative hepatitis have little diag-
stic value.

79 HALOTHANE AND ANTITUBERCULOUS DRUGS--A HEPATOTOXIC COMBINATION? (Ger.) Schmidt-
lcke, H. A.; Wolfert, W.; Grundmann, E. (St.-
anziskus-Hospital Munster, Hohenzollernring 72,
4400 Munster, W. Germany). *Z. Gastroenterol.*
(8):504-511; 1977.

o women who were being treated with isoniazid
00 mg/day) and rifampicin (600 mg/day) or etham-
tol (1,200 mg/day) for tuberculous arachnoiditis
the optic chiasm and lung tuberculosis, resp., de-
loped toxic liver damage a few days following halo-
ane anesthesia for corneal transplantation and
r the treatment of an abscess of a cholecystectomy scar, resp. Both patients had normal liver function before the surgery. Jaundice, pathologically increased serum ammonia, bilirubin, and SGOT levels, and grade III hepatic encephalopathy with somnolence, disorientation, and amnesia were observed. Australia antigen was not found. One patient had undergone halothane anesthesia before tuberculostatic treatment without any complication. Liver biopsy revealed alterations (focal or centrilobular/intermedial liver cell necrosis) compatible with drug hepatitis. The findings did not resemble, however, typical isoniazid hepatitis or typical halothane hepatitis, which suggests the occurrence here of combined toxic effects of halothane and isoniazid on the liver. Complete remission was achieved in both cases in 10-28 days by low-protein diet and lactulose treatment. The absence of literature data concerning an increased incidence of hepatotoxic complications due to the simultaneous use of isoniazid and halothane suggests the possibility of a particular predisposition to this phenomenon in these patients.

8480 LIVER DAMAGE FROM LONG-TERM METHYLTESTOSTERONE [Letter to Editor]. (Eng.) Bird, D. R.; Vowles, K. D. J. (Royal Devon and Exeter Hosp., Exeter, Devon EX2 5DW, England). *Lancet* 2(8034):400-401; 1977.

8481 PORTAL HYPERTENSION WITHOUT LIVER CIRRHOSIS DUE TO CHRONIC VITAMIN A POISONING. (Dut). van den Brandt-Gradel, V. (No affiliation given). *Ned. Tijdschr. Geneeskd.* 122(1):25; 1978.

See also, 8456, 8495.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

82 RECENT FINDINGS ABOUT THE EPIDEMIOLOGY OF VIRAL HEPATITIS. (Ger.) Baumgarten, R.;
ngler, J. D. (Stadtisches Krankenhaus Prenzlauer
rg, Nordmarkstrasse 15, DDR-1055 Berlin, E. Ger-
ny). *Z. Gesamte Inn. Med.* 32(22):627-630; 1977.

brief review of the present state of knowledge
garding the infectivity and transmission of viral
patitis, sterilization and disinfection to protect
ainst it, hepatitis B surface antigen (HBsAg)-
rriers, and the risk of acquiring hepatitis in the health professions is presented. Hepatitis A (HA) and hepatitis B (HB) are caused by two different organisms; cross-immunity does not exist. Although both diseases are contracted by both fecal-oral and parenteral routes, the former is predominant in HA, and the latter in HB. Incubation time and the length of the infectious period of both diseases are discussed. HBsAg carriers may be symptom-free. Hepatitis viruses are relatively resistant to heat and chemical agents. The best method of avoiding transmission by way of fomites

is by use of disposable equipment. Physical sterilization methods offer better protection than do chemical methods. The causative agent of HA is generally only excreted briefly by patients except in carriers; however, the HB virus may persist in patients for a long time, serving as a constant source of infection. Persons in the health professions face the greatest risk of contracting viral hepatitis. Patients posing the greatest threat as sources of infection are, in order, chronic dialysis patients, drug addicts, hepatitis patients without demonstrable HBsAg, and HBsAg positive patients. Measures that should be undertaken in dialysis units to reduce the risk of transmission are outlined.

8483 SERO-EPIDEMIOLOGY OF ACUTE VIRAL HEPATITIS. (Ger.) Mueller, R.; Willers, H.; Hoepken, W. (Medizinische Hochschule Hannover, Karl-Wiechert-Allee 9, D-3000 Hannover 61, W. Germany). *Munch. Med. Wochenschr.* 120(15):517-520; 1978.

A sero-epidemiological survey was conducted of 329 patients from the Hannover area, comprising virtually all patients from this area with clinically demonstrated acute viral hepatitis in 1975. Antibodies to hepatitis A virus (anti-HA), cytomegalovirus, and the hepatitis B surface antigen (HBsAg) were determined in all sera; IgM levels were also measured. In HBsAg-negative sera, antibodies to HBsAg (anti-HBs) and to HB core antigen (anti-HBc) were determined also. The diagnosis of hepatitis A (56 cases) was made only in cases in which seroconversion or a fourfold increase in anti-HA titer was observed during the course of the disease; in cases in which only a single serum sample was available, the demonstration of increased IgM levels in addition to the presence of anti-HA sufficed for the diagnosis. Contamination of the population with hepatitis A virus was high and increased with age, despite the low incidence of acute hepatitis A disease. Hepatitis A patients contracted the disease by contact with hepatitis A infections or during trips to southern Europe. All HBsAg-positive cases in this study (211 cases) were recognized as hepatitis B, as neither seroconversion nor significant increases in anti-HA titer were measured during the course of the disease. Non-A, non-B hepatitis was diagnosed in 62 patients. Fifty percent of the hepatitis B patients and 42% of the non-A, non-B hepatitis patients had been exposed parenterally to potentially infectious agents.

8484 VIRAL HEPATITIS AND PREGNANCY. (Fre.) Merger, C.; Chadeyron, P. A.; Levy, J. (Hopital Foch, 40 rue Worth, F 92151, Suresnes, France). *J. Gynecol. Obstet. Biol. Reprod. [Paris]* 1(4):529-536; 1977.

The epidemiology, symptoms, and prognosis of mother and infant were studied in nine women who developed long-incubation viral hepatitis during pregnancy. Hepatitis B virus (HBV) infection was suspected in four patients who had been inoculated or had blood withdrawn, and contagious hepatitis possibly due to HBV was suspected in the other five patients, only two of whom were known to have been in contact wit a source of contagion. Hepatitis A virus was rule out as a cause because of the incubation periods s by these patients. Symptoms appeared in the 5th t 36th week of pregnancy and did not differ from tho usually observed in viral hepatitis. The disease lasted 15-30 days in seven of nine patients. Thre patients were treated at the onset with corticosteroids and one was treated with steroids after a relapse. Neither chronic hepatitis nor serious jaundice was observed in any of the nine patients. Of the nine women, five delivered premature infant (between 26 and 36 weeks of gestation), and premat ty was the primary determinant of fetal prognosis. infant born at 29 weeks was stillborn and death ma have been due to a small retroplacental hematoma associated with a placenta previa and inhalation of amniotic fluid rather than maternal hepatitis. The other infants were normal at birth and not unusually small for the length of the respective pregnancies. Microscopic examination of the nine placentas did not reveal any sign of viral infection. Neonatal progress of the eight surviving infants was slow; they required an average of 16.2 days to recover their birth weights. Excluding th icterus due to birth at 28 weeks, three infants we jaundiced for many days. Since premature delivery is the most serious complication of viral hepatiti in pregnancy, beta-adrenergic drugs should be used with caution in threatened early labor.

8485 MATERNAL TRANSMISSION OF THE HEPATITIS VIRUS: FREQUENCY AND CONSEQUENCES. (F Buffet, C.; Larouze, B. (Hopital Antoine-Beclere, 157 rue de la Porte-de-Trivaux, F 92141 Clamart, France). *Gastroenterol. Clin. Biol.* 1(12):1053-1 1977.

The literature on the transmission of hepatitis B virus (HBV) from the mother to the fetus or to th neonate is reviewed with respect to frequency, mo of transmission, and consequences. Studies from occidental countries show that hepatitis B surfac antigen (HBsAg), whose presence indicates exposur to the virus, is rare in infants with mothers who are chronic carriers of HBsAg but frequent when t mother had acute hepatitis during the third trime of pregnancy. Studies from oriental countries sh that there is a higher percentage of infants with HBsAg born to mothers who are chronic HBsAg carri The presence of HBsAg in the serum of the father no influence on HBsAg level in the infant. Transmission of HBV *in utero* is suggested by the fact that blood obtained from umbilical cord is positi for HBsAg, the frequency of this event varying f study to study. Some neonates have HBsAg-positi cord blood although their mothers were HBsAg-nega tive. Electron microscopy has revealed some of components of Dane particles in cord blood. Amn otic fluid has also been shown to be HBsAg-posit One study showed an elevated probability of an i fant being HBsAg-positive up to 6 months of age the cord blood was also positive. The possibili that HBV is transmitted from mother to infant vi blood ingested by the infant during birth or via penetration through skin scratches during early e considered. Transmission via maternal milk does t appear to occur since HBsAg has not been found human milk. Maternal transmission of HBV has no mediate serious consequences. Infants born to sAg-positive mothers are usually asymptomatic sAg carriers with moderate and fluctuating elevaons in transaminase levels. Chronic hepatitis ersistent or active) and cirrhosis seem to be re outcomes; hepatitis usually occurs between 2 d 5 months after birth and is serious, with risk hepatic coma, chronic hepatitis, and postnecrotic rrhosis. Malformations such as biliary atresia ve been found in infants born to mothers who were sAg-positive but statistical studies have not been rformed. The risk of primary liver cancer (PLC) greater when the mother is HBsAg-positive and the ther negative for antibody to HBsAg. Families of tients with PLC have elevated levels of HBsAg and tibody to HB core Ag.

36 IMMUNOLOGICAL ASPECTS AND PROPHYLACTIC AND THERAPEUTIC PROBLEMS OF VIRAL HEPATIS. (Ita.) Fiaccadori, F.; Pizzaferri, A. niversita degli Studi di Parma, Parma, Italy). *nerva Med.* 68(62):4153-4172; 1977.

oblems of viral hepatitis are reviewed and disssed emphasizing hepatitis antigens in serum, e immunological response (humoral and cellular) hepatitis, and prophylactic and therapeutic imications. Antibody to hepatitis B core antigen nti-HBc) appears to be an indication of active ral replication whereas antibody to HB surce Ag (anti-HBs) appears to signal a state induced immunity. The behavior of immunoobulins in acute and chronic hepatitis, the forion of cytotoxic immune complexes, and the imological cellular response are analyzed with ard to the relation between changes in the ime system and the clinical course of the disease. was found that, generally, IgA and IgG levels within normal limits, while IgM levels are hin the normal limits for patients who are HB rface Ag (HBsAg)-positive and are significantly evated for those who are HBsAg-negative. Stand- gammaglobulins are fairly effective against pe A hepatitis, and notable protection has been monstrated in chimpanzees by a vaccine against pe B. Standard gammaglobulins are ineffective HBsAg-positive hepatitis, but gammaglobulins om individuals with high anti-HBs levels in the ood are effective in such cases and have been ed successfully to treat fulminant hepatitis.

37 HUMORAL AND CELL-MEDIATED IMMUNITY TO HEPATITIS B VIRUS ANTIGENS IN ACUTE AND ONIC LIVER DISEASE. (Eng.) Aldershvile, J.; etrichson, O.; Hardt, F.; Nielsen, J. O.; Skinhoj, (Kommunehospitalet, DK-1399 Copenhagen K, Denk). *Scand. J. Gastroenterol.* 12(8):917-922; 7.

e specific humoral immune response to hepatitis virus (HBV) antigens (hepatitis B surface anti- [HBsAg], hepatitis B core antigen [HBcAg], and hepatitis B e antigen [HBeAg]) was correlated with the cellular immunity to HBsAg and the clinical course of the HBV infection. Twelve patients were investigated after clinical and biochemical recovery from acute viral hepatitis type B and 13 were examined during the acute phase of type B hepatitis; 13 other patients had chronic active hepatitis with or without cirrhosis, 8 patients had chronic active non-B liver disease, 10 patients had miscellaneous HBV-negative liver diseases, and 12 subjects were healthy volunteers. None of the 13 patients examined during the acute phase of type B hepatitis had antibody to HBsAg (anti-HBs), but all 12 convalescent patients had anti-HBs. All patients had anti-HBc at all phases of viral hepatitis. HBeAg was present transiently in one patient. A cellular immune response to HBsAg (migration index <0.93) was found in 4 of 13 patients during the acute phase and in 7 of the 12 patients in the convalescent phase. Seven patients were studied longitudinally for cellular immune response to HBsAg. During the acute phase, migration inhibition was found in two patients only. In contrast, at the time the HBsAg was cleared in six patients, five had a cellular immune response to HBsAg. One of the nonresponding patients developed persistent hepatitis B surface antigenemia, and the other patient had been HBeAg-positive for several weeks. After HBsAg clearance, the migration index returned to normal in all five patients with previous inhibition. Only one patient with chronic type B hepatitis showed a cellular immune response to HBsAg, which was similar to the findings in two patients in each of the two remaining groups. The latter results suggest that a cellular immunity to HBsAg is not a prerequisite for the development of these conditions.

8488 IMMUNOGLOBULINS IN SUBMASSIVE HEPATIC NECROSIS. (Eng.) Kaymakcalan, H.; Dourdourekas, D.; Szanto, P. B.; Ainis, H.; Steigmann, F. (Cook County Hosp., 1825 W. Harrison St., Chicago, IL 60612). *Am. J. Gastroenterol.* 69(3, Part 1):289-294; 1978.

Immunoglobulin levels were determined in 34 patients with acute viral hepatitis and correlated with other parameters such as the levels of serum total globulins, gamma globulins, hepatitis B surface antigen (HBsAg), and enzymes to determine whether the immunoglobulin levels could be of prognostic or diagnostic significance. Seventy-three percent of the 15 patients with typical acute viral hepatitis (as determined by liver biopsy) had a slightly elevated serum globulin level (mean 3.6 g/100 ml). IgG was elevated above normal in 13 of the 15, ranging between 1,325 and 2,450 mg/100 ml in these patients, and was normal in the other two (1,010 and 1,210 mg/100 ml, resp.). The IgM level was elevated in 14 patients, the mean level being 305 mg/100 ml in all these patients. Of the 19 patients with submassive hepatic necrosis, 47% showed low serum globulin levels (mean 3.21 g/100 ml). The IgG levels were below the normal range in seven patients, within normal limits in six, and slightly elevated in six. Among the latter six patients, three showed only very slight elevations (1,300, 1,360, and 1,385 mg/100 ml, resp.), whereas the other patients had levels of 1,475, 1,800, and 1,650 mg/100 ml, resp. The IgM levels were moderately elevated in 14 patients (mean 279 mg/100 ml). The difference between the IgG levels in the two groups was statistically significant ($p<0.01$). Only 31.55% of the 19 patients with submassive liver necrosis showed slight elevations of the IgG level, while 86% of patients with classical viral hepatitis had elevated levels. These results suggest that the differential diagnosis of submassive hepatic necrosis in viral hepatitis from classical viral hepatitis can be aided by determining the serum IgG level.

8489 ACUTE AND CHRONIC HEPATITIS REVISITED: REVIEW BY AN INTERNATIONAL GROUP. (Eng.) Scheuer, P. J.; Bianchi, L.; De Groote, J.; Desmet, V. J.; Gedigk, P.; Korb, G.; *et al.* (Royal Free Hosp., London NW3 2QG, England). *Lancet* 2(8044): 914-919; 1977.

The pathological features of chronic hepatitis and their importance in the development of cirrhosis are reviewed. The development of chronic liver disease following acute hepatitis is also discussed. Chronic persistent hepatitis is a term referring to portal inflammation, with preserved lobular architecture and little or no fibrosis. There is little likelihood of direct progression to cirrhosis. A new category, chronic lobular hepatitis (CLH) had been proposed to describe the liver lesion in patients with prolonged hepatocellular dysfunction in whom the pathological changes are mainly confined to the lobules. These changes comprise spotty necrosis and inflammation as found in acute viral hepatitis. Piecemeal necrosis and bridging necrosis are not regarded to be part of the CLH lesion. Chronic aggressive hepatitis (CAH) has been redefined as a chronic inflammatory and fibrosing liver lesion of varied etiology and variable histological features. The features common to all untreated examples are piecemeal necrosis together with new fiber formation and lymphocytic infiltration of portal tracts and lobules. Other infiltrating cells may also be found, and features of acute hepatitis may be superimposed. Passive septa formed by collapse after bridging or multilobular liver cell necrosis may be present. Cirrhosis is not a defining criterion but may develop. Signs of liver cell regeneration are usually seen in CAH, and the borderline between CAH and cirrhosis in the more severe cases is not sharp. The confluent type of necrosis (i.e., central-central bridging, central-portal bridging, or multilobular necrosis) seen in acute hepatitis is often followed by healing and sometimes by complete recovery. In piecemeal necrosis however, where there are portal-to-portal connections, the development of chronic liver disease is likely. The authors believe that the morphological feature of greatest importance in the evolution of chronic hepatocellular disease is the infiltration of the tissue by lymphocytes and plasma cells that accompanies piecemeal necrosis and probably represents a continuing immunological reaction, at least in viral cases. The process by which acute hepatitis evolves into chronic liver disease requires careful analysis in different centers, so that the natural history and response to treatment of the different components can be accurately determined.

8490 THE CLINICAL EVOLUTION OF VARIOUS FORMS OF HEPATITIS. (Ger.) Maier, K. P. (Medizinische Universitatsklinik, Hugstetter Strasse 55, 7800 Freiburg, W. Germany). *Therapiewoche* 28(5): 738-746, *passim*; 1978.

Two forms of acute hepatitis, hepatitis A (HA) and hepatitis B (HB), may be distinguished from each other on the basis of the presence of HB surface antigen (HBsAg) in the blood of HB patients and of HA antigen (HAAg) in the blood of HA patients. A third form, non-A, non-B hepatitis may also be distinguished and may be more than one entity; it appears mostly as post-transfusion hepatitis. In HB patients, antibodies to the HB virus (HBV) core antigen (anti-HBc) may be found in the serum even after HBsAg has disappeared. The antibody against HBsAg (anti-HBs), may appear months after an acute HB attack. In a patient with suspected acute hepatitis, the transaminase levels are determined first. The Australia antigen test for determination of HBsAg follows demonstration of high transaminase levels. If both tests are positive, the patient is classified as having acute HB. Ninety percent of acute hepatitis patients recover spontaneously; medicinal therapy does not exist for this disease. Some patients evolve chronic hepatitis; HB patients are more at risk than are hepatitis A patients in this respect. In cases of chronic hepatitis, the presence of HA or HB must be determined. If the disease is neither HB nor HA, it may be chronic aggressive hepatitis (CAH) or chronic persistent hepatitis; the former must be treated, while the latter generally heals itself. Therapy for CAH with transaminase levels more than 10 times the normal value, SGPT 5 times the normal value, and an increase in gammaglobulin levels consists of administration of prednisolone by itself or in combination with azathioprin generally for more than 1 yr.

8491 NON-A, NON-B HEPATITIS. (Eng.) Feinstone, S. M.; Purcell, R. H. (Natl. Inst. Allergy Infectious Disease, Natl. Inst. Health, Bethesda, MD 20014). *Ann. Rev. Med.* 29:359-366; 1978.

Evidence that at least one additional agent, antigenically unrelated to hepatitis A or B viruses, is etiologically responsible for human viral hepatitis is reviewed. The epidemiology of this non-A, non-B hepatitis resembles that of type B hepatitis more than that of type A disease. Non-A, non-B hepatitis frequently follows blood transfusion and can progress to a chronic state, which makes its control highly important. Attempts to identify an antigen specific for non-A, non-B hepatitis or to transmit the disease to nonhuman primates have so far been unsuccessful. The only known means to prevent this disease is by the exclusive use of volunteer sources of blood for

nsfusions. The efficacy of immune serum glob-
n in preventing non-A, non-B post-transfusion
atitis is poorly defined. Other nonspecific
hods for screening blood donors, such as
suring enzyme levels, are currently under in-
tigation.

2 IDENTIFICATION OF HEPATITIS A VIRUS IN
FECES: DIAGNOSTIC AND EPIDEMIOLOGICAL
UE. (Fre.) Coursaget, P.; Maupas, P.; Hibon, P.;
deau, A.; Sizaret, P. Y.; Despert, F. (Hopital
iatrique Gatien de Clocheville, F 37000 Tours,
nce). *Nouv. Presse Med.* 6(44):4109-4113; 1977.

presence of virions was detected by immunoelec-
n microscopy in the feces of 11/13 patients with
atitis A. Fecal samples were suspended in a hy-
lysate of lactalbumin, and the viral-containing
ction was concentrated by successive centrifuga-
ns. Polyethyleneglycol 6000 was added to the
al suspension to a final concentration of 10%.
viral particles were observed ultrastructurally
er adding anti-hepatitis A virus immune serum
epared from a patient with hepatitis A 2 months
er onset of icterus), incubation at 37 C for 1
concentration by centrifugation, and staining
h uranyl acetate. The two negative fecal samples
e collected 1 month after onset of clinical signs
hepatitis. Samples with highest concentrations
virus particles were collected during the pre-
eric phase of the disease. The limit of the
iod of detection of virus was 5 days after onset
jaundice. There appeared to be a correlation
tween elevation of SGPT level and the presence
virions. A kinetic study of the appearance of
tibodies was performed in one patient. Specific
tibodies against hepatitis A virus reached a
ximum 2 months from the time of onset of jaundice.

93 e ANTIGEN (e)/e ANTIBODY (ANTI-e) AND
TRANSMISSION OF HEPATITIS B AMONG HOUSE-
LD CONTACTS [Abstract]. (Eng.) Perrillo, R.;
lis, F.; Clay, P.; Wellinghoff, W.; Gelb, L.;
ch, R. (Cochran Veterans Admin. Hosp., St. Louis,
). *Gastroenterology* 73(5):1239; 1977.

94 CARCINOEMBRYONIC ANTIGEN (CEA): A
SENSITIVE TEST FOR HEPATITIS [Abstract].
ng.) Molnar, I. G.; Gitnick, G. L. (Univ.
lifornia, Los Angeles, CA). *Gastroenterology*
(5):1235; 1977.

95 ETIOLOGY OF ACUTE HEPATIC FAILURE.
(Eng.) Depew, M. C. (Acute Hepatic
ilure Study Group, Univ. Southern California,
s Angeles, CA). *Gastroenterology* 73(5):1236;
77.

96 RELATIONSHIP BETWEEN SERUM α-FETOPROTEIN
AND e ANTIGEN IN ACUTE AND CHRONIC
PATITIS B INFECTION [Abstract]. (Eng.) Miller,
J.; Bloomer, J. R.; Williams, A. E.; Waldmann,
A.; McIntire, K. R.; Klatskin, G. (Dept. Medicine, Yale Univ., New Haven, CT). *Gastroenterology* 73(5):1234; 1977.

8497 VIRAL HEPATITIS, TYPE B CARRIER STATE--A PSYCHOSOCIAL PROBLEM [Abstract]. (Eng.) Powers, R.; Kiernan, T. (Veterans Admin. Hosp., East Orange, NJ). *Gastroenterology* 73(5):1240; 1977.

8498 IMMUNOGLOBULINS AND COMPLEMENT LEVELS IN ACUTE VIRAL HEPATITIS [Abstract]. (Eng.) Meyer, O.; Keynan, A.; Skibin, A.; Chattah, F.; Quastel, M. R. (Soroka Medical Center, Beersheba, Israel). *Isr. J. Med. Sci.* 13(10):1044; 1977.

8499 ANTIVIRAL THERAPY IN HEPATITIS B INFECTION [Abstract]. (Eng.) Merigan, T. C.; Smith, J. L.; Pollard, R. B.; Neal, E. A.; Sawhney, V.; Gregory, P. B.; Robinson, W. S. (Stanford Univ. Medical Center, Stanford, CA 94305). *J. Supramol. Struct.* (Suppl. 2):229; 1978.

8500 INHIBITION OF HEPATITIS B DNA POLYMERASE BY INTERCALATING AGENTS. (Eng.) Hirschman, S. Z.; Garfinkel, E. (Mount Sinai Sch. Medicine, New York, NY 10029). *Nature* 271(5646):681-683; 1978.

8501 HEPATITIS B ANTIGEN AND ANTIBODY: PREVALENCE AMONG NEW YORK DENTISTS. (Eng.) Jackson, R. J.; Lyman, D. O.; Weil, R. B.; Pert, J. H.; Stevens, R. W. (Epidemic Intelligence Service, State of New York Dept. Health, Tower Building, Empire State Plaza, Albany, NY 12237). *N.Y. State J. Med.* 78(2):222-224; 1978.

8502 THE SIGNIFICANCE OF ELECTROENCEPHALOGRAPHY IN EVALUATION OF SEVERITY AND COURSE OF VIRAL HEPATITIS. (Rus.) Farber, N. A.; Gubsky, L. V. (D. I. Ivanov Inst. Virology, Acad. Medical Science USSR, Moscow, USSR). *Vestn. Akad. Med. Nauk. SSSR* (9):43-45; 1977.

8503 CHRONIC HEPATITIS AS A CONSEQUENCE OF ACUTE VIRAL HEPATITIS. (Pol.) Zielinska, W. (Kliniki Chorob Zakaznych, Instytutu Chorob Wewnetrznych Am w Gdansku, Gdansk, Poland). *Pol. Tyg. Lek.* 32(37):1431-1433; 1977.

See also, 8144, 8439, 8441, 8442, 8443, 8446, 8454, 8471, 8597.

Chronic Hepatitis

8504 TREATMENT OF CHRONIC ACTIVE HEPATITIS: AN ANALYSIS OF THREE CONTROLLED TRIALS.

(Eng.) Wright, E. C.; Seeff, L. B.; Berk, P. D.; Jones, E. A.; Plotz, P. H. (Veterans Admin. Hosp., 50 Irving St., N.W., Washington, DC 20422). *Gastroenterology* 73(6):1422-1430; 1977.

Three controlled trials of the use of corticosteroids and cytotoxic drugs in the therapy of chronic active hepatitis (CAH) were analyzed as to whether the experiments are designed and executed according to current standards for a controlled study and whether the results can be applied to the entire spectrum of CAB. A trial of no therapy (27 patients) versus prednisolone (PS, 22) at the Royal Free Hospital (RFH) during 1963-1967, a trial of azothioprine (A, 25) versus prednisone (P, 22) at the King's College Hospital (KCH) during 1968-1971, and a trial at the Mayo Clinic (MC) that initially (1967-1970) involved placebo (17) versus P (18) versus A (14) versus P + A (14) and later (1967-1974) added the modality of titrated P on alternate days (PT, 31) with 16, 30, 13, and 30 patients in the other 4 groups, resp., are reviewed in detail. In the RFH trial, the mortality was 56% in the untreated group and 14% in the PS group ($p<0.001$); in the KCH trial, mortality was 5% and 28%, resp., in the P and A groups; in the MC trial, the mortality in the P and P + A groups was significantly lower ($p<0.05$) than in the placebo and A groups, and P + A was shown to be superior to PT in inducing histological remission while causing fewer adverse side-effects. When 16 separate factors of design and execution were assessed, the RFH trial met 5 and partially met 2, the KCH trial met 6 and partially met 3, and the MC trial met 12 of the criteria. Although some of the omissions were unavoidable and the perfect trial probably cannot be executed, the deficiencies must nevertheless affect the results, particularly the lack of a placebo-treated group in the RFH and KCH trials, which in essence tested only drug efficacy, whereas the MC trial also permitted an analysis of risk factors. Summarizing the results of these three trials, the authors conclude that the only CAH patients in whom the benefit from corticosteroid therapy has been shown to outweigh the potential drug toxicity are those who are symptomatic, hepatitis B surface antigen (HBsAg)-negative, and who have severe histological abnormalities (subacute hepatitis with multilobular necrosis or cirrhosis). The authors believe that the results of these studies cannot be applied to the entire spectrum of CAH as currently recognized; biochemical and serological screening procedures are now able to detect CAH among asymptomatic individuals, so that a further evaluation of corticosteroid therapy is required for patients who are asymptomatic, HBsAg-positive, or who have the milder histological lesion of CAH alone.

8505 D-PENICILLAMINE IN THE TREATMENT OF CHRONIC ACTIVE LIVER DISORDERS.

(Ita.) Manzillo, G.; Sagnelli, E.; Balestrieri, G. G.; Maio, G.; Izzo, C. M.; Romano, F.; *et al.* (Clinica delle Malattie Infettive dell'Universita di Napoli, Napoli, Italy). *Clin. Ter.* 82(2):117-126; 1977.

The effectiveness of D-penicillamine therapy in patients with chronic active liver diseases (CALD) was studied in 36 patients of whom 27 were hepatitis B surface antigen (HBsAg)-positive; 25/36 were treated with D-penicillamine for 6-12 months and 11/36 terminated the treatment before 6 months. A control group of 17 CALD patients was given placebo for 6-12 months; 15/17 were HBsAg positive. The study group was given D-penicillamine: 300 mg/day for 1 week, 600 mg/day for 1 week, 1,200 mg/day for 1 week, 1,800 mg/day for 4 weeks, and then maintained with 700-900 mg/day. They also received 300 mg/day of vitamin B_6 p.o. throughout the period of treatment. Patients treated with D-penicillamine, whether for 6 or 12 months, had a statistically significant reduction in levels of SGOT and SGPT ($p<0.01$ and $p<0.05$, resp.) Also the serum IgM levels were significantly lower in these patients than in the control group ($p<0.01$). Of the 25 treated for >6 months, histological activity completely disappeared in 7, was reduced in 4, did not change in 13, and increased in 1. In the control group, 4 had a reduction, 11 showed no change, and 2 had an increase in histological activity. Side-effects of the drug were skin eruptions, temporary granulocytopenia in the initial phase of treatment, and proteinuria with or without hematuria. The authors will consider D-penicillamine a valid therapeutic alternative to corticosteroids once their findings are confirmed in a larger series.

8506 SOME MORPHOLOGICAL DATA ON CHRONIC HEPATITIS.

(Ita.) Giarelli, L.; Bianchi, C.; Antonutto, G. (Istituto di Anatomia e Istologia Patologica dell'Universita, Trieste, Italy). *Minerva Med.* 68(55):3779-3784; 1977.

Morphological aspects of chronic hepatitis are discussed to contribute a clearer understanding to the term chronic hepatitis. A direct immunofluorescence technique using antibody to hepatitis B surface antigen HBsAg conjugated to fluorescein can detect HBsAg in biopsied liver tissue. In the case of granulomatous hepatitis, an etiological diagnosis is often not possible solely on the basis of morphology. In these cases, tuberculosis is often the cause. Important differences in evaluation tend to be made on biopsy and autopsy materials. With biopsies, there is a tendency to overevaluate the observed modifications, while there is a tendency to underevaluate abnormalities seen at autopsy. Problems are encountered when distinguishing between chronic hepatitis and myelolymphoproliferation. An 82-yr-old man was treated for chronic lymphatic leukemia with antimitotic and cortisone drugs. At autopsy, a generalized cryp tococcoidosis was discovered; accumulations of crypto cocci were visible in the intralobular regions of the liver. A biopsy of a 69-yr-old woman, for whom clinical and laboratory data strongly suggested eosinophilic leukemia, revealed large numbers of eosinophils along with other types of cells infiltrating the liver. The liver of a 77-yr-old woman with Waldenstrom's disease showed fibrosis and a lymphoid infiltrate in the portal spaces. At autopsy, a 54-yr-old woman who had suffered for a number of years with cryoglobulinemia had fibrotic portal spaces and a lymphoid infiltrate; the infiltrate was immunofluorescent IgM-positive. These data illustrate that there is a morphological continuum between certain forms of chronic hepatitis and hemolymphoproliferative disease, which makes it difficult to distinguish between these types of lesions. Morphological data can help determine the causes of these disease states.

8507 SOME PECULIARITIES OF THE CONDITION OF THE GASTRODUODENAL REGION IN PATIENTS WITH CHRONIC HEPATITIS (DATA ON ENDOSCOPY AND INTRAGASTRIC pH-METRY). (Rus.) Grigoriev, P. Yu.; Georgievsky, N. I.; Triiger, I. I.; Ledoschuk, B. A.; Chertov, A. D. (Dept. Therapy, Blagoveshchensk Medical Inst., Blagoveshchensk, USSR). *Ter. Arkh.* 48(9):57-61; 1976.

8508 SIGNIFICANCE OF PROTEOLYTIC FACTOR IN THE ORIGIN OF DUODENITIS AND JEJUNITIS IN CHRONIC HEPATITIS AND LIVER CIRRHOSIS. (Rus.) Yakhontova, O. I. (Dept. Hosp. Therapy, Leningrad Inst. Medicine and Hygiene, Leningrad, USSR). *Ter. Arkh.* 48(9):54-57; 1976.

See also, 8071, 8144, 8387, 8439, 8441, 8443, 8446, 8459, 8461, 8466, 8471, 8487, 8489, 8496, 8503, 8518, 8526, 8528.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

8509 DRINKING AND DIETARY HABITS AND PREVALENCE OF SOMATIC ABNORMALITIES IN CHRONIC ALCOHOLICS HOSPITALIZED FOR DETOXIFICATION. (Eng.) Wallerstedt, S. (Sahlgrenska sjukhuset, Univ. Goteborg, S-41345 Goteborg, Sweden). *Acta Hepatogastroenterol.* 25(1):6-12; 1978.

The alcoholic histories, drinking and dietary habits, and physical status of 61 male chronic alcoholics were studied within 3 days after the end of the last debauch. The mean duration of alcoholism was 11 yr. The duration of the debauches usually varied between 1.5 and 3.5 weeks. Forty patients were "intermittent drinkers," who did not admit any alcohol consumption between debauches. None of the patients had chronic liver damage, but steatosis was present in 23 of the 33 patients in whom a liver biopsy was carried out. Only one patient each was found to have fibrosis and cirrhosis, resp. The amount of steatosis was not correlated to any parameter concerning drinking or dietary habits. There were statistically significant correlations between the final daily amount of alcohol consumed and heart rate ($p<0.05$), between the duration of the last debauch and the systolic blood pressure ($p<0.05$) and the diastolic pressure ($p<0.01$), and between the presence of Dupuytren's contracture and the age of the alcoholic ($p<0.01$).

8510 CLINICAL ASPECTS OF ALCOHOLIC HEPATITIS: A REVIEW OF 26 CASES. (Eng.) Demeulenaere, L.; Van Waes, L. (Sint-Andrieskliniek, Krommewalstraat 9, B-8880 Tielt, Belgium). *Acta Gastroenterol. Belg.* 40(7/8):261-270; 1977.

The clinical features in 26 patients with biopsy-proven alcoholic hepatitis are reviewed. Only seven patients were hospitalized because of prominent liver-related symptoms (jaundice, ascites, or abnormal liver function tests). The onset of disease was mostly insidious, and weakness, anorexia, and weight loss were the most common complaints (experienced by 24, 22, and 16 patients, resp.). Right upper quadrant pain was present in 11 patients. The association of fever, abdominal pain, and jaundice in five patients made the differential diagnosis between hepatitis and a surgical biliary condition difficult. Six patients were seen in delirium tremens, and four presented with manifestations of hepatic encephalopathy. Three patients progressed to liver pre-coma or coma. Two patients each developed minor gastric bleeding associated with gastritis or diffuse s.c. hematomas secondary to clotting abnormalities. Hepatomegaly occurred in 16 patients, and 8 were found to have ascites. In five patients, ascites developed in the absence of cirrhosis; all had pericentral venous sclerosis on liver biopsy, and two also had a low serum albumin level. In six patients, spider angiomata occurred during the acute phase of the disease. SGOT and SGPT levels were elevated above 45 U in 81% and 65% of the cases, resp. Transaminase elevation was usually moderate, and rarely exceeded 10 times the normal upper limit. The gamma-glutamyltranspeptidase level was elevated in 93%. Alkaline phosphatase and bilirubin levels were elevated in 73% and 39%, resp. Two patients (one with cirrhosis) died during the acute phase. Both had marked jaundice, abdominal pain, tender hepatomegaly, and spiking fever on admission. Three of 10 patients with hepatitis and fatty liver who continued drinking progressed to cirrhosis and 1/10 to fibrosis after 3, 6, 8, and 48 months, resp. Four patients who stopped drinking had full clinical and biochemical recovery. Repeat biopsy in two patients who did not abstain showed persistent necrosis and inflammation, but a biopsy in one patient who abstained showed a normal liver. It is concluded that clinical symptoms and biochemical alterations are unreliable indicators of the degree of liver injury in alcoholic hepatitis.

8511 CLINICO-PATHOLOGICAL EXPERIENCE WITH ALCOHOLIC HEPATITIS.

(Eng.) McDonald, G. S. A.; Hourihane, D. O. (Div. Lab. Medicine, Trinity Coll., Dublin, Ireland). *Ir. Med. J.* 71(2):47-51; 1978.

A clinico-pathological study was carried out in 32 Irish patients, and differences between these patients and those reported in the American literature are discussed. The most common clinical findings in the 20 Irish patients in whom a liver biopsy was carried out were raised levels of serum enzymes (89%) and a palpable liver (74%). The most common findings reported in a series in the American literature were palpable liver (81%) and pyrexia (56%); the incidence in the American series of nausea and vomiting (55%), abdominal pain (46%), and leukocytosis (56%) was greater than in the Irish patients (35%, 26%, and 19%, resp.). Among the Irish patients, alcoholic hepatitis was diagnosed before the liver biopsy in only one instance. Among the 12 Irish patients in whom alcoholic hepatitis was discovered at autopsy, liver failure due to alcoholic hepatitis with or without liver cirrhosis was the cause of death in 6. Alcoholic hepatitis was recorded as a clinical diagnosis in only 1 of the 12 patients. The pathological diagnosis of alcoholic hepatitis was based on the presence of necrosis and polymorphonuclear infiltration of the parenchyma and portal tracts. Two patients with severe necrosis had central vein phlebitis. Mild to moderate fatty change was present in 30 cases, and severe fatty change occurred in the remaining 2 patients. In contrast, fatty change was present in only 87% of the American cases. Alcoholic hyaline was observed in 45% of the 20 patients who underwent biopsy and in 58% of the autopsy cases; the presence of alcoholic hyaline occurred with a similar frequency in the American series. Fibrosis was present in 85% of the liver biopsy specimens and in 63.9% of the American cases. It appears that the clinical symptoms of alcoholic hepatitis are somewhat less severe in Irish patients in comparison with those in American patients. Such a diagnosis should be considered in alcoholic patients with an enlarged tender liver and raised serum enzyme levels.

8512 ALCOHOLIC HEPATITIS: RECENT PROGRESS IN THE STUDY OF THE PHYSIOPATHOLOGY AND CLINICAL FEATURES OF LIVER DAMAGE INDUCED BY ALCOHOL.

(Ita.) Lovisetto, P.; Actis, G. C.; Ferraris, R.; Marchi, L.; Biarese, V. (Istituto di Medicina Interna dell'Universita di Torino, Torino, Italy). *Minerva Med.* 68(62):4127-4146; 1977.

Recent progress in the study of the physiopathology and clinical features of liver damage induced by alcohol is reviewed and discussed with respect to the metabolism of alcohol, the effects of alcohol on the liver, histological characteristics and histogenesis of acute alcoholic hepatitis, and clinical characteristics, laboratory reports, diagnosis, prognosis, and therapy of alcoholic hepatopathy. The clinical picture is usually marked by the sudden onset of nausea, icterus, painful hepatomegaly, fever, ascites, and signs of encephalopathy. Laboratory tests can reveal hyperbilirubinemia, elevated alkaline phosphatase levels, elevated gamma-glutamyl transpeptidase activity, and augmented levels of bile salts. Leukocytosis and hyperuricemia may also be present. Needle biopsy can reveal various degrees of qualitative and quantitative damage (vacuolar degeneration, steatosis, cell necrosis, inflammatory infiltration, and interlaminar hyaline sclerosis) that depends on the extent of alcohol intake. Mallory bodies associated with polymorphonuclear cell infiltration and centrilobular sclerosis are characteristic indications of alcoholic hepatitis. Steatosis is also a common and diagnostic result of chronic alcohol intoxication. Progress of the disease is dependent to a large degree on immunological considerations. Treatment consists of elimination of alcohol, rest, and dietary management (high-protein and high-caloric diet).

8513 BIOPSY-DEMONSTRATED HEPATIC CHANGES IN CHRONIC ALCOHOLISM.

(Ger.) Lorenz, G. (Pathologische Institut, Ernst-Moritz-Arndt-Universitat, Fr.-Loeffler-Strasse 23e, DDR-22 Greifswald, E. Germany). *Z. Gesamte Inn. Med.* 33(5):145-148; 1978.

To classify hepatic damage due to alcoholism, random adult liver biopsies obtained during a 5-yr period from 2,952 patients, 506 of whom were clinically demonstrated alcoholics, were examined histologically. Of the alcoholics, 473 were men. The histological findings permitted the grouping of the biopsies into four categories. The first category (showing liver changes with no specific outstanding disease findings) comprised 39% of the biopsies from alcoholic patients; the second (consisting of fatty livers) comprised 40%; the third (alcoholic hepatitis) encompassed 18% of the biopsies; and the fourth (demonstrating cir-

osis) comprised 3%. The mean age of persons
th alcoholic hepatitis was 40 yr in men, 45
women. Iron deposits, which are supposed
have great diagnostic value in determining
coholic hepatic damage, were present in 48%
the cases, and cholestasis was present in 20%.
coholic hepatitis developed in most cases in 10-
yr after the beginning of ethanol abuse. Fatty
ver originated predominantly in the abuse of
cohol.

14 ELECTRON MICROSCOPIC STUDY OF ALCOHOLIC LIVER DISEASE WITH SPECIAL ATTENTION TO
E CHANGES OF MESENCHYMAL CELLS OF THE LIVER.
ng.) Balazs, M.; Varkonyi, S.; Pinter, A. (Janos
sp., Diosarok u. 1, H-1125 Budapest, Hungary).
p. Pathol. (Jena) 14(6):340-350; 1977.

ver biopsy material from 48 patients with
ronic alcoholism was studied ultrastructurally by
ectron microscopy to observe how liver damage is
fluenced by the disease progression. The patients
re grouped on the basis of clinical and histological
iteria: group I, 16 patients and alcoholic fatty
ver; II, 11 patients, fatty liver with increased
senchymal activity; III, 6 patients, acute alcoholic
patitis; IV, 8 patients, chronic alcoholic hepatitis;
d V, 7 patients, alcoholic cirrhosis. Fat accumula-
on, mitochondrial alteration (swelling of mitochon-
ia and elongation and aggregation of cristae), and
cal cytoplasmic degradation were demonstrated in
l cases with similar frequency and severity and
ere not correlated with the clinical severity of
e disease. However, proliferation of mesenchymal
ells, signs of their secretory activity, and fi-
er formation did correlate with the progression of
e disease. In group I, an increase of perisinu-
oidal fat-storing cells was noted in many cases.
group II, the number of mesenchymal cells was
creased; cytoplasm was abundant and rich in organ-
lles. In group III, leukocytes were present in
e sinusoidal wall and a basement membrane de-
eloped along Kupffer cells without significant
evelopment of collagen fibers in the Disse space.
e most prominent feature in group IV was the en-
argement and proliferation of Kupffer cells; the
ytoplasm was very rich in organelles and collagen
undles were seen around the Kupffer cells. In
roup V, proliferation of Kupffer cells was promi-
ent, and many of the perisinusoidal cells were
imilar to fibroblasts and protruded deeply between the liver cells; broad collagen bundles were situated in the intercellular space of liver cells. This study suggests that between alcoholic hepatitis and alcoholic cirrhosis there is another stage, the chronic alcoholic hepatitis stage (closely resembling chronic aggressive hepatitis), whose main characteristic is not the severity of the injury of the liver cells but the great proliferation of mesenchymal cells and lymphoid infiltration. There may be prognostic value in identifying those alcoholics whose fatty liver is combined with increased mesenchymal cell activity at the beginning of liver disease, possibly marking the onset of chronic liver disease.

8515 ASSOCIATION BETWEEN HLA-BW40 AND ALCOHOLIC LIVER DISEASE WITH CIRRHOSIS. (Eng.) Bell, H.; Nordhagen, R. (Oslo City Hosp., Oslo 1, Norway). *Br. Med. J.* 1(6116):822; 1978.

8516 THE EFFECT OF PORTACAVAL SHUNTING IN THE ALCOHOLIC CIRRHOTIC ON SERUM CHOLESTEROL CONCENTRATION: A RETROSPECTIVE STUDY. (Eng.) Kuo, J. Y.; Dreiling, D. A. (Mount Sinai Sch. Medicine, City Univ. New York, 100th St. & Fifth Ave., New York, NY 10029). *Am. J. Gastroenterol.* 68(3):270-272; 1977.

8517 THE FATTY LIVER: ROENTGENOLOGICAL RECOGNITION. (Eng.) Anonymous. (No affiliation given). *Am. J. Dis. Child.* 132(1):72; 1978.

8518 IN VIVO AND IN VITRO FIXATION OF IgA ON THE HEPATOCELLULAR MEMBRANE [Abstract]. (Eng.) Hopf, U.; Hutteroth, T. H.; Meyer zum Buschenfelde, K. H. (Freie Universitat Berlin, Klinikum Charlottenburg, Berlin, W. Germany). *Digestion* 16(4):357; 1977.

See also, 8251, 8441, 8442, 8443, 8459, 8461, 8487, 8595.

LIVER AND BILIARY TRACT

Cirrhosis

519 THE MORPHOLOGY OF CIRRHOSIS: RECOMMENDA-
TIONS OF DEFINITION, NOMENCLATURE, AND
LASSIFICATION BY A WORKING GROUP SPONSORED BY THE
ORLD HEALTH ORGANIZATION. (Eng.) Anthony, P. P.;
shak, K. G.; Kayak, N. C.; Poulsen, H. E.; Scheuer,
. J.; Sobin, L. H. (Middlesex Hosp. Medical Sch., London, England). *J. Clin. Pathol.* 31(5):395-414; 1978.

Guidelines on the definition, nomenclature, and classification of cirrhosis, chronic hepatitis, and hepatic fibrosis are presented, taking into account comments and criticisms from a number of pathologists and hepatologists throughout the world. Cirrhosis is defined as a diffuse process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules. The complete classification of cirrhosis in an individual case would take into account its morphological features, etiology, stage of evolution, activity, and complications. Among the systems of morphological categories currently in use, the division of cirrhosis into micronodular and macronodular forms is preferred. The former division is described as a cirrhotic liver in which nearly all nodules are less than 3 mm in diameter, whereas the latter is described as having many nodules over 3 mm. When micro- and macronodules are present in approximately equal proportions, the term "mixed" may be applied. Etiological diagnosis is usually reached by a combination of epidemiological, clinical, biochemical, immunological, and histological investigations. Established etiological associations include viral hepatitis, alcoholism, metabolic disorders, biliary disease, venous outflow obstruction, toxins and therapeutic drugs, and intestinal bypass surgery; debatable factors include autoimmunity, mycotoxins, schistosomiasis, and malnutrition. Types of cirrhosis of unknown etiology include Indian childhood cirrhosis, which has a well-defined pattern, and "cryptogenic" cirrhosis, which does not. Cirrhosis is easily identified at necropsy, but may be diagnosed by surgical wedge biopsy or needle biopsy. Helpful features for the recognition of cirrhosis in a needle biopsy specimen include presence of parenchymal nodules, differences in liver cell size and appearance, fragmentation of the biopsy specimen, fibrous septa, and altered architecture and vascular relationships. Complications of cirrhosis include ischemic necrosis, siderosis, biliary obstruction, and infection. Hepatocellular carcinoma in cirrhosis is often associated with liver cell dysplasia. Chronic hepatitis is defined as liver inflammation continuing without improvement for at least 6 months, and may be classified morphologically as chronic persistent or chronic active. Hepatic fibrosis is defined as the presence of excess collagen due to new fiber formation and is classified morphologically according to its location. In addition to the causes of cirrhosis, the following causes of hepatic fibrosis are recognized: congenital, metabolic, inflammatory, parasitic, toxic, vascular, and physical.

8520 CHRONIC NORMOPROTEINEMIC HEPATOPATHY. (Ita.) Buzzelli, G.; Gallerini, L.; Guarducci, A. M.; Laffi, G.; Mazzanti, R.; Smorlesi, C.; *et al.* (Istituto di Clinica Medica, Universita, Florence, Italy). *Recent. Prog. Med. (Roma)* 63(5):497-526; 1977.

The literature on normal serum protein levels in patients with chronic hepatopathy is reviewed, and data from a series of 8/121 patients with liver cirrhosis and 13/170 with chronic active hepatitis, all of whom had normal serum protein profiles, are reported. Diagnoses were based on clinical and laboratory findings, radiology, scintigraphy, and liver biopsies. With respect to cirrhosis, a comparison of patients with normal (6.55 ± 0.15 g/dl) and abnormal (6.49 ± 0.14 g/dl) serum protein levels revealed a statistically significant difference in the BSP retention test ($p<0.01$), in serum albumin level (3.81 ± 0.13 versus 2.99 ± 0.15 g/dl, resp., $p<0.01$), and in the levels of serum IgA (233.6 ± 51.4 versus 433.5 ± 67.2 mg/dl, resp., $p<0.05$), IgG (1,357.1 ± 132.5 versus 1,840 ± 143.8 mg/dl, resp., $p<0.05$), and IgM (127.9 ± 12.1 versus 262.4 ± 45.3 mg/dl, resp., $p<0.02$). Patients with cirrhosis and normal serum protein levels had normal protein electrophoretic patterns and normal serum levels of immunoglobulins. In chronic active hepatits, significant differences were found between patients with normal and with abnormal blood protein levels with respect to the total protein level (6.78 ± 0.12 versus 7.32 ± 0.14 g/dl, resp., $p<0.01$) and the IgG level (1,367.5 ± 124.5 versus 2,334.1 ± 193.4 mg/dl, resp., $p<0.01$). The antistreptolysin levels were elevated in patients with chronic active hepatitis and abnormal serum protein level ($p<0.01$). Follow-up of six of eight patients with liver cirrhosis and normal seru protein levels showed that one had retained a normal level for 1 yr, two for 18 months, two for 2 yr, and one for 3 yr. Follow-up of 13/13 patients with chronic active hepatitis and normal serum protein levels revealed that 6 continued to have normal levels for 6 months, 4 for 1 yr, 2 for 18 months, and 1 for 2 yr.

8521 TOPOLOGICAL ANALYSIS OF THE MORPHOGENESIS OF LIVER CIRRHOSIS. (Eng.) Takahashi, T. (Tohoku Univ. Sch. Medicine, Seiryomachi, Sendai, Japan). *Virchows Arch. [Pathol. Anat.]* 377(3):189-201; 1978.

Topological analysis of the morphogenesis of liver cirrhosis was carried out, using the total connectivity number pl, in the livers of six autopsy cases of chronic liver disease. The total p_1 amounted to 6,100,000 in chronic hepatitis of the periportal type and to 6,350,000 in portal cirrhosis, but to only 100,000 in posthepatic cirrhosis of the coarse-nodular type. In view of the similarity of values for p_1 in chronic hepatitis and portal cirrhosis, the forme is considered to give rise to the latter by continuous change in structure or through "piecemeal progression of the periportal lesion. Developmen of posthepatitic cirrhosis from chronic hepatitis is possible only through a substantial reduction in p_1, which is brought about by parenchymal necrosis that is extensive enough to cause multiple disconnection of the network.

8522 METABOLISM OF CARBOHYDRATES, ADMINISTER BY THE PARENTERAL ROUTE, IN PATIENTS WI CIRRHOSIS OF THE LIVER. (Eng.) Brodanova, M.; Brodan, V.; Filip, J.; Kordac, V.; Marecek, Z.; Kuhn, E. (Faculty General Medicine, Charles Univ. Prague, Czechoslovakia). *Acta Univ. Carol. [Med. (Praha)* 23(1/2):17-129; 1977.

tudy was conducted to evaluate metabolic re- nse to the parenteral administration of simple bohydrates in cirrhotic patients, to determine effect of tolbutamide and biguanide on this abolism, and to determine if the sugars were table for the treatment of patients with er cirrhosis. Groups of subjects, selected m 65 patients with morphologically confirmed er cirrhosis, received the following quanti- s of sugars and/or antidiabetic agents: a infusion (500 ml of 10% solution) of glucose over 30 min, 24 mg fructose (F) i.v. in a solution over 6 min, 50 g sucrose (S) i.v. a 10% solution over 10 min, 50 g F or 50 g itol (X) as a 10% solution over 30 min, each ar alone or after the i.v. administration of tolbutamide (T) or after the administration 260 mg/day of butyl biguanide for 1 week. surements of blood sugar, lactate (LA), uvate (PY), immunoreactive serum insulin (IRI), ctose, uric acid, and ammonia levels were made samples of venous blood collected during in- ion and for 45 min after infusion. Similar surements on healthy controls were available comparison. The blood sugar level rose after declined slightly after S and X, and was un- nged after F. T hastened the decline in blood ar level after G, and in the other sugars it led a decline of blood sugar below the initial level. lightly delayed the disappearance of blood ar after G, and produced a permanent rise blood sugar level after S. Serum IRI was hest after G, followed by F, X, and S. Tol- amide potentiated the IRI response during usion and during the subsequent 45 min. B uced the IRI increments after all sugars ex- t F. The LA increments were greatest after F, ghtly reduced by T, and increased by B. PY nges after F were always positive, and after X, ays negative. T and B gave a similar order of nge. The LA:PY ratio increased after all sugars was dependent on the amount of sugar. It was hest after F and lowest after G. T, and thus ulin, enhanced the sugar metabolism and gave s of retarding the release of gastrin from G ls and of inhibiting the action of gastrin on ietal cells, it may be difficult to reveal a ntitative relationship between the gastric G l and parietal cell populations.

3 THE EFFECT OF GLUCAGON ON FREE PLASMA AMINO ACIDS IN CIRRHOTICS AND HEALTHY TROLS.

(Eng.) Brodan, V.; Brodanova, M.; el, M.; Kuhn, E. (Inst. Clinical and Experimental icine, Budejovicka 800, Prague 4-Krc, PSC 14622, choslovakia). *Acta Hepatogastroenterol. (Stuttg.)* 1):23-29; 1978.

tial plasma amino acid levels and their changes er glucagon administration (1 mg by infusion) e studied in seven patients with compensated er cirrhosis and seven healthy controls after an rnight fast at absolute bedrest. Cirrhotic ients had significantly elevated basal levels of osine, citrulline, tryptophan ($p<0.01$), threo- e, phenylalanine, and methionine ($p<0.05$) and significantly lower levels of serine and ornithine ($p<0.05$). Total amino acidemia was significantly higher ($p<0.01$) in the cirrhotics (3.353 ± 0.234 mM) than in controls (2.978 ± 0.167 mM). Glucagon administration caused significant decreases in the levels of ornithine, leucine, lysine, histidine, arginine, methionine ($p<0.01$), alanine, glycine, valine, proline, glutamate, and citrulline ($p<0.05$). The initial concentrations of amino acids exhibited a negative correlation with the change in their concentrations after glucagon both in the healthy controls ($r=-0.766$, $p<0.001$) and in the cirrhotics ($r=0.591$, $p<0.001$); hence, the decrease after glucagon is a function of the initial concentration. Excluding cystine-cysteine (which increased) the mean percentage decline in total amino acid level was -14.57 ± 4.84% in controls and only -9.14 ± 5.85% in cirrhotics after glucagon, the difference between the two groups being significant ($p<0.01$). The percentage decrease in essential amino acids in each group was nearly the same. Serum ammonia levels increased significantly in both groups ($p<0.05$), while the serum urea level increased significantly ($p<0.01$) only in the healthy controls.

8524 HYDROELECTROLYTIC METABOLISM IN LIVER CIRRHOSIS: PHYSIOPATHOLOGICAL AND THERAPEUTIC ASPECTS OF THE REINFUSION OF CONCENTRATED ASCITIC FLUID.

(Ita.) Borghetti, A.; Fiaccadori, F.; Bruschi, G.; Coruzzi, A.; Guariglia, A.; Ghinelli, F.; *et al.* (Istituto di Semeiotica Medica, Universita degli Studi di Parma, Parma, Italy). *Minerva Med.* 69(1):53-66; 1978.

The acute effects of the reinfusion of concentrated ascitic fluid was determined in nine cirrhotic patients. During basal conditions, the plasma volume and the pools of the Na^+ and K^+ were evaluated in relation to total water volume with radioisotopic techniques. During reinfusion (10-12 hr), the elimination of Na^+, K^+, and H^+; the osmolar clearance; and the creatinine clearance were evaluated. During basal conditions, there were no significant variations in the blood concentrations of Na^+ and K^+ or in the osmolarity of the blood; the concentration of albumin was markedly low; the total body water was markedly elevated; the plasma volume and the sodium pool were augmented; the potassium pool was diminished; the ratio of plasma volume to the sodium pool was reduced; and renal function was reduced with respect to glomerular filtration. During the extraction-reinfusion treatment, there was no evidence of significant modifications of arterial pressure; the plasma volume was increased by 28%; the clearance of creatinine was significantly increased; and diuresis increased with respect to that in the pretreatment control period. After the treatment, the plasma volume remained elevated· the renal functions corresponded to those during basal conditions; and the volume of diuresis was reduced and returned (as in the period of pretreatment) to hypertonic conditions. These results should be taken into consideration when treating the ascitic syndrome.

8525 ALKALINE PHOSPHATASE ISOENZYMES IN LIVER CIRRHOSIS.

(Eng.) Burlina, A.; Bugiardini, R. (Centro Ospedaliero Borgo Trento, I-37100 Verona, Italy). *Enzyme* 23(2):121-126; 1978.

The origin and diagnostic and prognostic significance of the slow fraction (ALP_4) of alkaline phosphatase found in liver cirrhosis were investigated in sera from 114 patients with liver diseases. The isoenzymatic tracings of sera from 18 of the 49 patients with cirrhosis showed the ALP_4 band. In the presence of 5×10^{-3} M L-phenylalanine, sera with the ALP_4 band showed a mean residual phosphatase activity of 63.4-70.5% of the original activity, whereas sera without this band showed a mean residual phosphatase activity ranging from 74.3 to 85%. After heating sera without the ALP_4 band at 56 C for 10 min, normophosphatemic sera showed normal residual activity; hyperphosphatemic sera were notably thermoresistant, with residual activity between 30% and 52%. The sera with the ALP_4 band were thermolabile, with a residual activity ranging between 11% and 34.5%.

8526 EFFECTS OF MEDROXYPROGESTERONE ON THE LIVER FUNCTION AND DRUG METABOLISM OF PATIENTS WITH PRIMARY BILIARY CIRRHOSIS AND CHRONIC ACTIVE HEPATITIS.

(Eng.) Sotaniemi, E. A.; Hynnynen, T.; Ahlqvist, J.; Ahokas, J. T.; Puoskari, U.; Pelkonen, I. (Clinical Res. Unit, Univ. Oulu, SF-90220 Oulu 22, Finland). *J. Med.* 9(2):117-128; 1978.

Medroxyprogesterone acetate, a synthetic progestin, was administered to six patients with primary biliary cirrhosis (PBC) and chronic active hepatitis (CAH) to evaluate its therapeutic effect through analysis of liver function and drug metabolism. Before this trial, all patients except one had been treated with prednisolone, azathioprine, and/or phenobarbitol and had developed resistance and/or side-effects to these drugs. During treatment with doses of 10-15 mg medroxyprogesterone for periods of 8-76 months, liver function tended to normalize. Significant reductions in the levels of total serum bilirubin (from 29.0 ± 31.0 to 14.0 ± 14.8 μml/1, $p<0.05$), serum alkaline phosphatase (from 503.7 ± 411.8 to 369.5 ± 275.2 U/1, $p<0.05$), and BSP retention (from 27.4 ± 11.2 to 12.5 ± 10.2%, $p<0.03$) were noted. The levels of serum antibodies declined and the hepatic metabolic ability, as tested by serum albumin levels and indices of drug metabolism, improved. Serum albumin level rose from 41.7 ± 2.3 to 43.3 ± 2.8 g/l, $p<0.01$, plasma antipyrine half-life was reduced from 15.1 ± 7.1 to 7.7 ± 0.7 hr, $p<0.05$, and the cytochrome P-450 content of biopsy samples rose from 6.8 ± 1.5 to 10.5 ± 5.8 nmol/g during treatment. The subjective symptoms of the diseases decreased. The authors believe that the improved effect on the clinical condition of the patients may be due to the immunosuppressive effect of medroxyprogesterone compared with barbiturate treatment. The study shows that medroxyprogesterone treatment of patients suffering from PBC or CAH leads to the suppression of the immunological manifestations of the disease and may be a valuable alternative for patients who have developed resistance or undesirable reactions to previous therapy.

8527 SOMATOMEDIN IN CHRONIC LIVER DISEASE.

(Eng.) Marek, J.; Schullerova, M.; Schreiberova, O. (Third Medical Clinic, Charles Univ., Prague, Czechoslovakia). *Rev. Czech. Med.* 22(4):194-201; 1976.

Since recent studies have suggested that the liver is an important site of somatomedin formation, serum somatomedin levels were determined in 6 patients with cirrhosis, 3 patients with chronic hepatitis, and 13 healthy controls. The somatomedin level in each patient was markedly lower than the mean level in the healthy subjects. There was a significant correlation between the serum albumin levels and the somatomedin level in the patients with liver disease ($r=0.8653$, $p<0.01$). These results are consistent with the results of previous studies indicating that the liver is an important site of somatomedin synthesis.

8528 FORMATION OF VITAMIN D METABOLITES FROM ^3H- AND ^{14}C-RADIOLABELLED VITAMIN D-3 IN CHRONIC LIVER DISEASES.

(Eng.) Long, R. G.; Skinne R. K.; Wills, M. R.; Sherlock, S. (Royal Free Hosp., Pond St., London NW3 2QG, England). *Clin. Chim. Acta* 85(3):311-317; 1978.

The formation of 25-hydroxy vitamin D (25-OHD) and dihydroxyvitamin D metabolites was studied using a double-isotope method. To evaluate the hypothesis that there is a failure to form dihydroxyvitamin D metabolites in liver disease. Eight patients were studied; seven had primary biliary cirrhosis, and the eighth had cirrhosis due to chro active hepatitis. Four were vitamin D replete, and four were vitamin D depleted, as judged by the serum 25-OHD concentrations (<4.15% of 25-OHD dose/ serum). Three of the four vitamin D-depleted patients (including 2 with histological osteomalacia) formed radioactive 1,25-dihydroxycholecalciferol; one of the patients with a normal serum 25-OHD concentration also synthesized 1,25-dihydroxycholecalciferol, the mean maximum serum level being 4.03% of the dose/l serum in the four patients. 24,25-Dihydroxycholecalciferol was formed by all vitamin D-replete patients but not by any of the patients who were vitamin D depleted. 25,26-Dihydroxycholecalciferol was formed by all patients, except one who also formed no 1,25-dihydroxycholecalciferol. This study suggests that patients with liver diseas can form dihydroxy vitamin D metabolites.

8529 THE CIRRHOTIC PATIENT AND THE PORTACAVAL SHUNT IN 1977.

(Fre.) Huet, P. M.; Marleau, D.; Lavoie, P.; Tanguay, S.; Viallet, A. (Hopital Saint-Luc, 1058, rue St. Denis, Montreal, Quebec H2X 3J4, Canada). *Rev. Fr. Gastroenterol.* (131):29-36; 1977.

The results of portacaval shunts were evaluated in 30 patients in whom the procedure was performed be cause of liver cirrhosis and hemorrhage from esoph

geal varices. Ten patients also underwent arter-
alization of the portal vein. Prior to surgery,
he functional portal blood supply to the liver was
valuated by the uptake of indocyanine green (ICG)
y the hepatocytes or of ^{125}I-albumin by the Kupffer
ells. Of the 20 patients who had only the porta-
aval shunt, 19 survived 1-50 months (average, 18
onths). Hepatic encephalopathy developed in 7/19.
ll of the patients who developed encephalopathy had
minimal decrease in portal blood supply, with ICG
ptake values above 20% (average, 33.7%). The 12
atients who did not develop encephalopathy had ICG
ptake values below 20% (average, 11%). Of the 10
atients who had arterialization in addition to the
hunt, 7 survived 12-50 months (average, 24.3 months),
nd none developed encephalopathy. The values for ICG
ptake were low in three of seven patients and over
0% (average, 31.9%) in four of seven patients. This
tudy suggests several conclusions: (1) all patients
ho undergo portacaval shunts should have prior
tudies of liver hemodynamics, (2) patients with
epressed functional portal blood supply are less
ikely to develop hepatic encephalopathy than are
hose with normal supply, and (3) patients with a
inimal decrease in portal blood supply appear to
enefit from arterialization in addition to the
hunt, although further evidence for this conclusion
s needed.

8530 COINCIDENCE POSITRON IMAGING OF THE LIVER AND HEART FOLLOWING RECTAL ADMINISTRATION OF ^{13}N-AMMONIA IN LIVER CIRRHOSIS. (Eng.) Fukuda, N.; Tateno, Y.; Rikitake, T.; Matsumoto, T.; Tomitani, T.; Suzuki, K.; *et al.* (Natl. Inst. Radiological Sciences, Anagawa, Chiba-shi 280, Japan). *Radioisotopes* 26(12):872-875; 1977.

8531 HEPATIC CIRRHOSIS IN VARANASI (A HAEMOSTATIC APPRAISAL). (Eng.) Singh, D. S.; Dube, B.; Gupta, J. P. (JIPMER, Pondicherry, India). *J. Indian Med. Assoc.* 69(2):26-30; 1977.

See also, 8144, 8152, 8179, 8297, 8311, 8439, 8441, 8442, 8443, 8444, 8450, 8455, 8459, 8460, 8461, 8465, 8466, 8467, 8481, 8487, 8508, 8513, 8515, 8518.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

532 SURGICAL PROBLEMS OF PRIMARY SCLEROSING CHOLANGITIS. (Fre.) Salembier, Y.;
upont, A.; Bleuez, M.; Paris, J. (Cite Hospitaliere,
9, rue de la Louviere, 59000 Lille, France). *J.*
hir. (Paris) 114(6):451-460; 1977.

he clinical symptoms, pathology, differential
iagnosis, and treatment of primary sclerosing cho-
angitis are discussed and five cases are reported.
he cases included three women (ages 22, 21, and 43
r, resp.) and two men (ages 53 and 43 yr, resp.).
wo of the patients had typical symptoms such as
cterus, pruritus, bile retention with enlarged
nterlobular hepatic ducts, and hepatomegaly. The
ondition, described for the first time in 1924,
s characterized by a diffuse inflammation with
ibrous thickening and stenosing of the biliary
ucts in the absence of lithiasis. Primary scleros-
ng cholangitis affects men primarily (62.5% of
ases), whereas primary biliary cirrhosis affects
omen primarily (75% of cases). Additionally, in
he former entity, there are no antimitochondrial
ntibodies or xanthoma present, and pruritus is
ot a constant symptom (present in only 1/4 of the
ases). Microscopic examination of the liver shows
he biliary canals surrounded by a circular fibrosis.
ubmucosal and subserosal fibrosis with inflammatory infiltration is always observed in the extrahepatic ducts in primary sclerosing cholangitis and may only be observed there in some cases of primary biliary cirrhosis. Ulcerative colitis is associated with primary sclerosing cholangitis in about one of three patients. Treatment of choice is corticoids, specifically prednisolone, 10-25 mg/day, alone or with biliary drainage to relieve cholestasis. A biliary-gastrointestinal bypass may be performed at the convergence of the biliary ducts, but the surgery would deprive the patient of local treatment such as injection of cortisone into the biliary drain. Prognosis remains poor with average survival 4 yr from time of definitive diagnosis.

8533 INVOLVEMENT OF THE PANCREAS IN ACUTE CHOLECYSTITIS. (Ger.) Brunner, H.; Neher, M.; Schmidt, H. D. (Chirurgische Universitatsklinik, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Therapiewoche* 28(8):1419, 1422; 1978.

Involvement of the pancreas was found in 21 of 72 patients with acute cholecystitis. The pancreatic involvement was identified as an enzymatic shift without pathological substrate in the pancreas in nine cases, as accompanying pancreatitis in eight, as edematous pancreatitis in one, and as hemorrhagic necrotizing pancreatitis in three. In another series of 97 patients with pancreatitis (33 cases of edematous and 64 cases of hemorrhagic necrotizing pancreatitis), acute cholecystitis was found in 4 cases (1 in edematous and 3 in hemorrhagic necrotizing pancreatitis). Even though pancreatic involvement is rather frequent in choledocholithiasis, the pancreatitis in such cases is usually of canalicular genesis.

8534 THE PREREQUISITES FOR LOCAL LYSOLECITHIN FORMATION IN THE HUMAN GALLBLADDER. II. STUDIES ON THE POSITIONAL SPECIFICITY OF THE PHOSPHOLIPASE A ACTIVITY. (Eng.) Tagesson, C.; Norby, S.; Sjodahl, R. (Dept. Medical Microbiology, Univ. Linkoping, S-581 85 Linkoping, Sweden). *Scand. J. Gastroenterol.* 13(4):417-422; 1978.

The positional specificity of phospholipase A in human gallbladder epithelium was studied using biosynthetically radiolabeled diacylphosphoglycerides as substrates. When homogenized epithelial cells were incubated with ^{14}C-palmitate-labeled *Escherichia coli*, ^{14}C-phosphatidylethanolamine (^{14}C-PE) was degraded. During this degradation, ^{14}C-lyso-PE and ^{14}C-fatty acids were formed. When the homogenized cells were incubated with ^{14}C-oleate-labeled bacteria, ^{14}C-PE was degraded, but no ^{14}C-lyso-PE was formed. Instead, the formation of ^{14}C-fatty acids was increased. The pH optimum of ^{14}C-fatty acid synthesis with ^{14}C-oleate- or ^{14}C-palmitate-labeled bacteria was 7.0. Since ^{14}C-palmitate occupies predominantly the 1-acyl position and ^{14}C-oleate the 2-acyl position of the major *E. coli* diacylphosphoglycerides, these findings suggest that (a) the phospholipase attacks the 2-position of diacylphosphoglycerides and (b) a complete deacylation of diacylphosphoglycerides in the gallbladder wall is brought about by the combined action of phospholipase A$_2$ and a lysophospholipase, the latter having the ability to hydrolyze the 1-acyl-lysophosphoglyceride. It appears that the biochemical prerequisites for a local formation and degradation of lysolecithin in the gallbladder are met by the positional specificity of the enzymes present. This finding substantiates the hypothesis that lysolecithin is an adjustable mediator of aseptic cholecystitis.

8535 ENDOSCOPIC TRANSPAPILLARY SPLITTING OF A CHOLEDOCHOCELE. (Ger.) Miederer, S. E.; Lindstaedt, H.; Siedek, M.; Franken, Th. (Medizinische Poliklinik, Universitat Bonn, Wilhelmstr. 35, 5300 Bonn, W. Germany). *Dtsch. Med. Wochenschr.* 103(5):216-219; 1978.

A choledochocele with bile outflow obstruction from the biliary and pancreatic ducts was diagnosed by endoscopic retrograde cholangiopancreaticography in a 67-yr-old man who presented with radiating upper abdominal pain and a constantly elevated gamma-glutamyltransferase level 16 yr after cholecystectomy for cholecystolithiasis. After distention of the choledochocele with contrast medium, a papillotome was introduced through the papilla, and the choledochocele was split open. The patien required neither anesthesia nor an abdominal operation. There were no complications, and the patie experienced immediate complete cessation of the pains. The bile flow from both systems became normal.

8536 GRAY-SCALE ULTRASOUND B-SCANNING IN CAS OF CHOLELITHIASIS, ESPECIALLY WITH NEGA TIVE CHOLECYSTORADIOGRAM. COMPARISON WITH SURGICA AND RADIOGRAPHIC FINDINGS. (Ger.) Koppers, B. (Institut fur Rontgendiagnostik, Technische Univer sitat Munchen, Westendstrasse 85, D-8000 Munich 2, W. Germany). *Med. Klin.* 73(8):279-283; 1978.

The results of gray-scale ultrasound B-scanning w
compared with those of surgery and cholecystoradic
graphy in 37 patients. The gallbladder was visua
ized by ultrasonography in 36/37 patients. Surge
or radiography revealed no stones in 16 cases; th
ultrasonic scan was correctly negative in 14/16 c
and falsely positive in 2/16. Surgery or radiogr
revealed gallstones in 20 cases; the sonography w
correctly positive in 16/20 cases and falsely neg
tive in 4/20. The correlations between ultrasoun
and the other techniques were significant (p<0.00
The findings indicate the great diagnostic value
sonography, especially in the case of neagtive
radiography.

8537 ENDOSCOPIC PAPILLOTOMY AND REMOVAL OF GALLSTONES. (Eng.) Seifert, E. (Sta Krankenhaus Kemperhof, 1st Med. Klin., Koblenzer Str. 115, 5400 Koblenz, W. Germany). *Am. J. Gastroenterol.* 69(2):154-159; 1978.

The results, complications, and risks of endosco
papillotomy (EPT) in the treatment of choledocholithiasis or papillary stenosis in a total of 99
patients in nine centers in Germany are reported
The procedure was successful in 880 of the 955
cases. Choledocholithiasis was the most frequen
indication for EPT, being present in 743 patient
Seventy-seven percent of these 743 patients were
cholecystectomized. Papillary stenosis was the
indication for EPT in 14.7% of the cases and tu
in 1.3%. Choledocholithiasis was successfully
treated by EPT (either by spontaneous delivery o
by extraction) in 85.9% of cases. Complications
developed in 7.3% of the 880 cases. These inclu
perforation (13 cases), hemorrhage (16), cholangitis (13), pancreatitis (15), and stone impacti
following the procedure (6). In the remaining
case, the Dormia basket became impacted into the
common bile duct and had to be removed surgicall
Most complications occurred within 24 hr of the
procedure, only 12% occurring on the 2nd day.
Sixty-five percent of the complications were
treated conservatively, 5% endoscopically, and
surgically. Most hemorrhages were stopped cons
atively, and 9 of 13 perforations could be trea
in this manner. Cholangitis was reduced by the
introduction of an indwelling tube in the commo
duct immediately after EPT. All but one case o

ancreatitis was treated conservatively. The
ortality rate was 1.7%, and this was reduced to
.25% when patients who died of cardiac failure
ere excluded. The remaining causes of death in-
luded hemorrhage (1 case), septicemia (3), liver
bscesses (1), pancreatitis (3), peritonitis (1),
nd cholangitis (1). It is concluded that EPT is
seful in the treatment of high-risk but operable
atients with choledocholithiasis or papillary
tenosis.

538 A FOLLOW-UP STUDY OF LIVER FUNCTION TESTS
AFTER SURGICAL TREATMENT FOR GALLSTONE
ISEASES. (Eng.) Harada, T.; Sugaya, H.; Maehara,
.; Kimura, K.; Hisauchi, T.; Tajima, Y.; *et al.*
okkyo Univ. Sch. Medicine, Mibu, Tochigi, 321-02
apan). *Gastroenterol. Jpn.* 12(6):446-454; 1977.

lterations in liver function as measured by SGOT,
GPT, serum alkaline phosphatase, and serum bili-
ubin levels were studied in 204 patients during
he 1st month and in 113 patients up to 1 yr after
urgery for gallstone disease. Postoperative prog-
osis and subjective symptoms were collected by
questionnaire mailed to 201 patients 10 months
5 yr after surgery. At 1 month of follow-up,
04 patients were separated into five groups: A,
04 patients, liver function normal before and
fter surgery; B, 47 patients, liver function im-
roved after surgery; C, 14 patients, liver func-
ion transiently aggravated after surgery but later
mproved; D, 14 patients, liver function abnormal
efore and after surgery; and E, 25 patients, liver
unction obviously aggravated postoperatively. At
yr of follow-up, 113 patients were distributed
these five groups as follows: 69, 29, 20, 3, and
in A, B, C, D, and E, resp. In the patients
udied from 1 month to 1 yr after surgery, the
ncidence of liver dysfunction (patients classi-
ed into groups D and E) was higher in cases of
holedocholithiasis (28.6%) than in cases of chole-
ystolithiasis (12.0%); it was also higher in cases
perated by choledochotomy (17.6%) and with T-tube
rainage (21.5%) than in cases operated by chole-
ystectomy (8.8%), and in cases requiring blood
ansfusion (22.3%) than in cases without trans-
sion (12.0%). The effects of blood transfusion
d the presence of pathologic conditions requiring
ansfusion contributed to the high incidence of
normal liver function in the 18 cases with blood
ansfusion. The presence of acute biliary in-
ection requiring use of antibiotics also pro-
ced a higher incidence of liver dysfunction. The
erage operation time for patients in group A was
9.4 ± 43.1 min; this time tended to be longer in
e other groups (184.1 ± 91.5 min in B and 163.9
45.1 min in E). Thus, the location of gall-
ones, the surgical technique used, the operation
me, and the need for blood transfusion and for
tibiotics were found to influence the liver
nction parameters. The postoperative survey re-
aled a favorable prognosis in 73.2%, relatively
vorable in 17.1%, slightly poor in 8.0%, and
or in 1.2% of the 164 patients replying to the
estionnaire. Subjective symptoms reported diar-
ea (25.9%), back pain (25.9%), and abdominal pain
2.1%).

8539 DIET AND CHOLESTEROL GALLSTONES: A MULTI-CENTER STUDY. (Eng.) Sarles, H.; Gerolami, A.; Cros, R. C. (Unite de Recherches de Pathologie Digestive U-31 Inserm, 46, chemin de la Gaye, F-13009 Marseille, France). *Digestion* 17(2): 121-127; 1978.

The role of diet in the development of cholesterol gallstones was studied by comparing changes in mortality due to gallstones with changes in diet during recent years in the southeast of France, and by comparing diet with the prevalence of gallstones in seven countries. Statistics in France obtained between 1939 and 1971 show that total calorie, lipid, and animal protein intake increased markedly from 1943 to 1967. The onset of an increase in mortality due to gallstone disease began 6 to 7 yr after the onset of the dietary increases. A comparison of the incidence of gallstones found at autopsy in France, India, Japan, Portugal, South Africa, Sweden, and Uganda with the types of diets in these countries revealed that low-calorie, low-protein, low-lipid, high-vegetable content diets are associated with low incidences of gallstones. A positive correlation between calorie intake and gallstone incidence was found for calorie intakes lower than 3,000 kcal/day, whereas no such association was found for higher calorie intakes because incidence of gallstones then varies greatly. The results suggest that a hypocaloric diet associated with a low intake of fat and protein is protective against cholelithiasis.

8540 DIET AND CHOLESTEROL GALLSTONES: A FURTHER STUDY. (Eng.) Sarles, H.; Gerolami, A.; Bord, A. (Unite de Recherches de Pathologie Digestive U 31 Inserm, 46, chemin de la Gaye, F-13009 Marseille, France). *Digestion* 17(2):128-134; 1978.

The diets of two groups of women with cholesterol gallstones were compared with those of two groups of women without gallstones, to determine whether dietary factors influence the development of cholelithiasis. The total caloric intake, caloric intake excluding alcohol, carbohydrate intake, animal protein intake, vegetable protein intake, total protein intake, and fat intake in 202 women without gallstones were similar to those in 11 women with cholesterol gallstones. A similar study in 50 patients and 50 controls also showed no significant differences in the dietary intake in the two groups. The results of the present studies do not support those of studies following World War II, in which increased caloric intake after the war was followed by an increased incidence of cholelithiasis. It is proposed that undernutrition, as seen during the war, may reduce the chance of cholelithiasis in women.

8541 IN-VITRO STUDIES OF GALLSTONE DISSOLUTION: THE EFFECT OF ADDED HEPARIN IN BILE SALT SOLUTIONS. (Eng.) Furnival, C. M.; Burnett, W.; Green, M. K.; Selvage, N. C.; Cavaye, G.; Hardie, I. R. (Clinical Sciences Building, Royal Brisbane

Hosp., Brisbane, Queensland 4020, Australia). *Aust. N.Z. J. Surg.* 47(6):828-831; 1977.

The dissolving effect of four bile salt solutions upon gallstones was tested *in vitro* using syphonage to continuously fill and empty test chambers for a 10-day period. Solutions of sodium cholate (SC), sodium taurocholate (ST), sodium deoxycholate (SD), and sodium chenodeoxycholate (SCD), all 200 mM, were tested, and physiological saline (S, 0.9%), heparinized saline (HS, 100,000 IU/1), and lecithin (L, 100 mM) were used as controls; 226 stones from 38 patients were tested. No stones exposed to S, HS, or L lost weight. All stones exposed to bile salts lost weight (26% in SC, 26% in ST, 52% in SD, and 41% in SCD); the weight loss in SD was significantly greater than that in SC or ST ($p<0.01$). A combined solution of SC and ST produced a greater weight loss (38%) than did the components alone, but still less than did SD. The weight loss in SCD was significantly greater than that in ST or SC ($p<0.001$). Addition of H to solutions of SC or SD enhanced the weight loss of stones to 43% ($p<0.01$) or 77% ($p<0.05$), resp.; this enhancing effect persisted ($p<0.01$) when weight-matched stones from each of 10 patients were tested in the two solutions: in 9/10 cases, the H-enhancing effect on weight loss occurred. The addition of L to SC, SD, or SCD solutions produced a significant increase in weight loss only in the case of SC (36%, $p<0.05$), with slight increases in the other tests. Fragmentation occurred in 34 stones, with the greatest incidence in SD + H solution. The results suggest that the optimal solution for clinical use is a combination of SC and H because the possible toxic side-effects of SD + H preclude its use.

8542 CLINICAL STUDIES ON DISSOLUTION OF GALLSTONES USING URSODEOXYCHOLIC ACID. (Eng.)

Okumura, M.; Tanikawa, K.; Chuman, Y.; Koji, T.; Nakawa, S.; Nakamura, Y.; *et al.* (Fukuoka Univ. Sch. Medicine, 34 Nanakuma, Nishi-ku, Fukuoka, 814 Japan). *Gastroenterol. Jpn.* 12(6):469-475; 1977.

The clinical usefulness of ursodeoxycholic acid (UDCA) in the dissolution of gallstones was investigated in 74 patients with gallstones in functioning gallbladders who were treated for 6 months or more (mean duration of treatment, 8.5 months). All patients received 450 mg of UDCA daily. During the study, other choleretics, anticholesterol drugs, and thyroid hormones were not used. The size and number of gallstones were recorded by cholecystography, the criterion for drug efficacy being a reduction in stone size of at least 20% in diameter compared with diameter before treatment. The gallstones completely disappeared in 16 patients and partially dissolved in 16 others (effective rate, 43.2%). The gallstones remained unchanged in 35 patients and required surgery in 7. In 26 of 35 cases with gallstone symptoms, a marked reduction in the frequency and severity of symptoms was noted. UDCA effectiveness for total dissolution was significantly higher with smaller stones (33.3%, 18.2%, and 5.9% for stones <5, 6-10, and >11 mm, resp.) Large numbers of small-sized stones were most easily reduced, the effective rate for complete or partial dissolution being 21.4% for small (<2 mm), 24.0% for moderate (3-9 mm), and 38.1% for large (>10 mm) numbers of gallstones. The rate of complete disappearance in 24 patients with floating gallstones was 33.3% and 19.1% in 42 without floating gallstones. The effective rate for complete or partial dissolution was 27.3% among 22 patients with some calcification of gallstones and 52.5% among 46 patients without calcification. The disappearance rates in this study clearly exceed the rate of spontaneous disappearance of gallstones (about 7.8%). Administration o either chenodeoxycholic acid (CDCA) or UDCA produc a marked increase in excretion of UDCA in bile, di inished cholesterol saturation of bile, and ultima the dissolution of cholesterol gallstones. While was harmful to liver function and increased hemoly activity due to formation of increased amounts of thocholic acid, UDCA produced no significant chang in blood or liver function tests. UDCA appears to as effective as CDCA in the dissolution of gallsto with few side-effects (soft stools in 4 patients a constipation in 1).

8543 MODIFICATIONS INDUCED BY URSODEOXYCHOLIC ACID (UDCA) ON THE LIPID COMPOSITION OF BILE AND PLASMA IN PATIENTS WITH CHOLESTEROL GALLSTONES. (Ita.)

Salvioli, G.; Salati, R.; Lugli, R.; Fratalocchi, A. (Istituto di Clinica Medica Generale dell'Universita di Modena, Modena, Italy) *Gazz. Med. Ital.* 136(10):517-530; 1977.

The effect of ursodeoxycholic acid (UDCA) on lipi and cholesterol levels in bile and plasma and on gallstone dissolution was investigated in 18 patients with cholesterol gallstones (16 patients with gallbladder stones and 2 with common duct stones). The daily doses of UDCA used were 500 m g (8 patients), 600 mg/g (1), 700 mg/g (1), 800 m g (5), or 1,000 mg/g (3); the range was 6.6-15.6 kg. The lithogenic index (LI) was determined before and after 1-3 months of treatment. The LI decreased from an average value of 2.02 before treatment to an average value of 0.99 after treatment ($p<0.001$), whereas the percentage of biliary UDCA plus chenodeoxycholic (CDCA) increased from 46.4% to 72%. There was an important difference between the patients treated with 500 mg/g UDCA and those treated with greater doses: the former group had 38.94 ± 9.76 and 31.18 ± 7.95% UDCA and CDCA, resp., whereas the latter had 47.98 ± 10.9 and 26.56 ± 6.05% UDCA and CDCA, resp., after treatment. The lithocholic acid level showed no significant alterations after treatment. Radiological examination carried out every 4 months showed gallstone disappearance in two cases and reduction in five after 8-12 months of treatment. The liver function tests were unchanged during the treatment period. Bile triglyceride levels decreased significantly ($p<0.01$) due to a reduction in very low density lipoproteins, where as there were small increases in the phospholipi levels and in high density lipoproteins. Cholesterol levels decreased in both bile and plasma. A remarkable effect on the subjective symptoms was noted in all patients. No side-effects were recorded in any patient.

8544 THE EFFECT OF ORAL CHENODEOXYCHOLIC ACID ON CHOLESTEROL SOLUBILITY IN HEPATIC BILE. (Eng.) Matsushiro, T.; Kobayashi, N.; Suzuki, N.; Yamauchi, H.; Sato, T. (Tohoku Univ. Sch. Medicine, Sendai 980, Japan). *Tohoku J. Exp. Med.* 124(2):187-196; 1978.

To determine the optimum dose of chenodeoxycholic acid (CDCA) in cholesterol dissolution, 14 patients who underwent cholecystectomy with T-tube drainage for cholesterol gallstone disease received 250, 750, or 1,500 mg CDCA daily for 7 days, following clamping of the T-tube. Seven patients received the 250-mg dose, while the other seven received the 750-mg dose for 7 days; the dose was increased to 1,500 mg in the latter patients, and this dose was given for a further 7 days. Hepatic bile samples were taken daily from the day before treatment through the last day of treatment, by releasing the T-tube clamp. There were no significant changes in the bile cholesterol, phospholipid, or total bile acid content after treatment in any of the three treatment groups, nor in a control group of five patients. Cholesterol solubility was calculated as (B+P)/C, where B is total bile acids, P is the phospholipid level, and C is the cholesterol level in hepatic bile. Before treatment, solubility ranged between 5.3 and 6.0 in the treatment group, and the value in controls was 6.1. In the group treated with 250 mg of CDCA, the mean value was 11.0 ± 4.0 on the 2nd day, 10.4 ± 2.8 on the 4th day, and 9.6 ± 1.3 on the 6th day ($p<0.05$ in all cases). A significant increase ($p<0.05$) in cholesterol solubility was also found in patients treated with 750 mg on the fourth day, but no increases occurred in patients given 1,500 mg or in controls. When the doses were calculated in terms of body weight, increases in solubility were slight in the three patients receiving 4.5 mg CDCA/kg or less in the 250-mg/day group, the highest increase being only 70%. In the other four cases in this group, who were receiving 4.6 mg/kg CDCA or more, the increase was over 100%. Among the patients in the 750 mg/day group, three patients receiving 15.0 mg/kg or less showed a 0% increase or lower. Those receiving over 15.0 mg/kg did not show as dramatic a response as did those in the 250 mg/day group receiving 4.6 mg/kg CDCA or more. It is concluded that the optimum dose of CDCA for increasing biliary cholesterol dissolution is between 5 and 12 mg/kg. The only side-effect of CDCA was transient SGOT and SGPT elevation in a patient receiving 750 mg daily.

545 NONLITHIASIC CHOLECYSTOPATHY OR CHOLECYSTOSIS: CLINICAL AND STATISTICAL DATA ROM 1,027 CHOLECYSTOGRAPHIES. (Spa.) Javier Adell lvarez, F.; Pujol Soler, R.; Mozo Pous, F.; Salord snes, J. (Institucion Clinica "Tres Torres," Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 51(4): 81-390; 1977.

8546 PRIMARY SCLEROSING CHOLANGITIS: REPORT OF A CASE. (Fre.) Spay, G.; Donne, R.; Toure, P.; Vu, Q. D. (58 rue Lt-Colonel-Prevost, 69006 Lyon, France). *Lyon Chir.* 73(5):380-384; 1977

8547 EARLY SURGERY IN ACUTE CHOLECYSTITIS. (Rus.) Shmauss, A. K.; Vekner, V. (Friedrichshain Hosp., Berlin, E. Germany). *Khirurgiia (Mosk.)* (1):87-88; 1978.

8548 VOLEMIC CHANGES IN ACUTE CHOLECYSTITIS. (Rus.) Garibdzhanian, A. L. (Faculty Dept. Surgery, I. M. Sechenov First Moscow Medical Inst., Moscow, USSR). *Sov. Med.* (9):54-57; 1977.

8549 VASCULAR AND TISSUE CHANGES OF THE GALLBLADDER IN ACUTE CHOLECYSTITIS. (Rus.) Mukhamedov, S.; Kakharov, A. (Abuali ibn-Sino Tadzhik State Medical Inst., USSR). *Dokl. Akad. Nau Tadzh. SSR* 20(7):63-67; 1977.

8550 CHANGES IN THE STRUCTURE OF THE LIVER IN CALCULOUS CHOLECYSTITIS. (Rus.) Deenichin, P.; Protokhristov, H. (Dept. Hosp. Surgery, Faculty Medicine, Plovdiv, Bulgaria). *Khirurgiia (Mosk.)* (7):35-37; 1977.

8551 GALLSTONE ILEUS. (Spa.) Barreiro Alvarez F.; Lorenzo Garcia, M. L.; Mateo Martinez, A.; Mata Juberias, A. (Ciudad Sanitaria de la S. S. "La Paz," La Paz, Argentina). *Rev. Esp. Enferm. Apar. Dig.* 51(6):667-678; 1977.

8552 GALLSTONE ILEUS. (Ger.) Helwing, E.; Jung, D. (Medizinische Hochschule, Pasteurallee, 3000 Hannover 51, W. Germany). *Dtsch. Med. Wochenschr.* 102(51):1887-1888; 1977.

8553 DISSOLUTION OF BILIARY CALCULI BY MEANS OF CHENODEOXYCHOLIC ACID. INITIAL OBSERVATIONS. (Cze.) Hrabak, P.; Doskova, M.; Skorepa, J. Souchova, E. (IV. Interni Klinika Fakultni Nemocnice I. s poliklinikou, KUNZ SKNV, Prague, Czechoslovakia) *Cas. Lek. Cesk.* 116(43):1337-1342; 1977.

8554 THERAPEUTIC TRIAL OF DRUGS OTHER THAN CHENODEOXYCHOLIC ACID IN CHOLELITHIASIS [Abstract]. (Fre.) Capron, J. P. (Centre Hospitalier Universitaire, Amiens, France). *Gastroenterol. Clin. Biol.* 1(11):962-963; 1977.

8555 THE SHORT CHOLEDOCHUS SYNDROME: CASE REPORT AND RETROGRADE ENDOSCOPIC VISUALIZATION OF THE BILIARY SYSTEM. (Eng.) Lehmann, H.; Popken, H.; Schlaak, M. (Zentrum Konservative Medizin I der Universitat Kiel, Schittenhelmstr. 12, 2300 Kiel, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):158-161; 1978.

LIVER AND BILIARY TRACT

8556 REVIEW OF 555 CHOLECYSTECTOMIES WITHOUT DRAINAGE. (Eng.) Carpenter, W. S.; Kambouris, A. A.; Allaben, R. D. (Mount Carmel Mercy Hosp., Detroit, MI). *Am. Surg.* 44(4):200-205; 1978.

8557 CHOLECYSTECTOMY: TO DRAIN OR NOT TO DRAIN. A RANDOMIZED PROSPECTIVE STUDY OF 200 PATIENTS. (Eng.) Maull, K. I.; Daugherty, M. E.; Shearer, G. R.; Sachatello, C. R.; Ernst, C. B.; Meeker, W. R.; Griffen, W. O., Jr. (Medical Coll. Virginia, Box 893, Richmond, VA 23298). *J. Surg. Res.* 24(4):259-263; 1978.

8558 THE PHYSICAL CHEMISTRY OF CHOLESTEROL SOLUBILITY IN BILE: RELATIONSHIP TO GALLSTONE FORMATION AND DISSOLUTION IN MAN. (Eng.) Carey, M. C.; Small, D. M. (Peter Bent Brigham Hosp., Boston, MA 02115). *J. Clin. Invest.* 61(4):998-1026; 1978.

8559 PERCUTANEOUS COMMON DUCT STONE REMOVAL. (Eng.) Carter, B. L.; Millan, V. G.; Sarno, R. C. (Tufts New England Medical Center, Boston, MA). *Abdom. Surg.* 20(3):60-65; 1978.

8560 CONTROLLED TRIAL OF CHENODEOXYCHOLIC THERAPY FOR RADIOLUCENT GALLSTONES: A MULTICENTER STUDY. (Eng.) Gerolami, A.; Sarles, H.; Brette, R.; Paraf, A.; Rautureau, J.; Debray, C.; *et al.* (Unite de Recherches de Pathologie Digestive, INSERM U-31, 46, chemin de la Gaye, F-13009 Marseille, France). *Digestion* 16(4):299-307; 1977.

8561 EXPERIENCE WITH PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY USING THE JAPANESE NEEDLE. (Eng.) Ariyama, J.; Shirakabe, H.; Ohashi, K.; Roberts, G. M. (Dept. Gastroenterology, Juntendo Univ., 3-1-3 Hongo, Bunkyo-ku, 113 Tokyo, Japan). *Gastrointest. Radiol.* 2(4):359-365; 1978.

8562 TYPE OF GALL STONES IN NORTH-WEST INDIA. (Eng.) Mooppan, M. M. U.; Jain, S. K.; Gupta, N. M.; Subrahmanyam, D.; Talwar, B. L. (Postgraduate Inst. Medical Education and Res., Chandigarh, India). *Bull. Postgrad. Inst. Med. Ed. Res. Chandigarh* 11(3):138-140; 1977.

See also, 8075, 8143, 8144, 8146, 8151, 8152, 8154, 8155, 8158, 8159, 8167, 8174, 8176, 8177, 8300, 8367, 8402, 8439, 8440, 8442, 8443, 8462, 8466, 8467, 8469, 8492, 8596, 8600.

GENERAL

8563 CARCINOEMBRYONIC ANTIGEN (CEA) TEST AND OTHER IMMUNOLOGICAL INVESTIGATIONS IN THE FOLLOW-UP OF ADENOCARCINOMA OF THE GASTROINTESTINAL TRACT. (Ger.) Hasler, E.; Spengler, A.; Berchtold, R.; Brunner, K. W.; de Weck, A. (Onkologische Abteilung, Inselspital, CH-3000 Bern, Switzerland). *Schweiz. Med. Wochenschr.* 107(47):1683-1691; 1977.

The carcinoembryonic antigen (CEA) levels were measured in 40 patients with gastric adenocarcinoma and in 85 patients with colorectal adenocarcinoma before and after surgery. The CEA level was above normal (>2.5 ng/ml) in 24/40 patients with gastric adenocarcinoma before surgery; the other 16 patients had normal CEA levels (false-negative results). Direct correlation was found between the tumor size, distant metastases, prognosis, and operability on one hand and the CEA level on the other. Radical surgery was possible in 9/16 patients with preoperatively normal CEA levels, and in 3/24 patients with elevated CEA level. Among the patients with gastric adenocarcinoma who underwent radical surgery, the incidence of recurrences has been 2/9 in the case of initially normal CEA level, versus 2/3 in the case of initially elevated CEA level. The preoperative CEA level was elevated in 58/85 patients with colorectal adenocarcinoma and normal (false-negative) in the others. Radical surgery was possible in 25/27 patients with initially normal CEA level and in 30/58 patients with elevated CEA level. The preoperatively elevated CEA level dropped to normal or decreased after surgery, depending on how radical the surgery was, while the CEA level showed further increase in the inoperable patients. The increase in the CEA level during the follow-up period was the earliest sign of distant metastases in most cases. The CEA test is a valuable tool in the follow-up of patients with gastrointestinal adenocarcinoma.

8564 NECROTISING ENTERO-COLITIS FOLLOWING UMBILICAL VEIN CATHETERISATION. (Eng.) Shah, K. J.; Corkery, J. J. (Children's Hosp.,

dywood Middleway, Birmingham B16 8ET, England).
in. Radiol. 29(3):295-301; 1978.

fteen cases of neonatal necrotizing entero-
litis (NEC) following umbilical vein (UV) cath-
erization are reported. Ten patients had ex-
ange blood transfusions and the others had UV
fusions of bicarbonate, dextrose, or fructose
r respiratory difficulties, convulsions, or
poglycemia. Symptoms occurred from 12-72 hr
ter transfusion or infusion and included abdom-
al distention (15 patients), abdominal tender-
ss (9), bile-stained vomiting (9), constipa-
on (8), blood per rectum (4), abdominal mass
), and diarrhea (1). Twelve patients required
rgery. The mortality rate was 4/15 patients.
e initial diagnosis of NEC was usually made by
ain radiography. Radiological features in-
ided bowel obstruction (8), peritonitis (5),
cites (4), pneumoperitoneum (3), pneumatosis
testinalis (5), thumbprinting (1), abscess and
stula (2), and intrahepatic gas (1). Patho-
ical findings at operation or post-mortem exam-
ation showed ulcers, infarcts (the principal les-
s in NEC), perforations, peritonitis, pneumatosis
testinalis, congested vessels, and inflammatory
iltrate in vessel walls. In all the present
ses, the UV catheters had been introduced
ndly and their position had not been localized
diologically. When the course of the catheter
rough the UV-ductus venosus (DV)-inferior
a cava (IVC) segment is followed radiolog-
lly, the properly positioned catheter viewed
the antero-posterior projection curves gently
the right of the mid-sagital line at T12
el before entering the DV. The lateral
w determines the exact location of the catheter
; when properly placed, it should be in the
or even the right atrium. The difficulty of
perly positioning the UV catheter without
iological localization and the association of
alpositioned catheter with NEC are presented.
authors recommend radiological localization
a radiopaque catheter as a sensible pre-
uisite to beginning UV transfusion or infusion.
y note that the radiographs can be taken with
imal handling of the patient on a portable x-
machine.

5 PERSISTENT POST-ENTERITIS DIARRHOEA.

(Eng.) Zoppi, G.; Deganello, A.; Gaburro,
(Cattedra di Auxologia and Clinica Pediatrica
l'Universita, Policlinico Borgo Roma, 37100
ona, Italy). *Eur. J. Pediatr.* 126(4):225-236;
7.

groups of pediatric patients--A, 18 patients
months old; B, 30 patients 12-30 months old--
h chronic diarrhea following acute enteritis
e evaluated clinically, biochemically, and gas-
enterologically. The principal symptom in all
ients was mild but persistent diarrhea for 4.5
.7 and 12.5 ± 4.9 months in groups A and B,
). Growth was impaired in 12/18 patients in A
in 24/30 patients in B. Before hospitaliza-
, all patients had been treated with antimicrobial drugs and had received milk-free, high-fiber diets. Laboratory studies gave the following results in groups A and B: mean hemoglobin, 10.4 ± 0.9 and 11.8 ± 1.1 g/dl, resp.; RBC, 4.1 4.1 ± 0.6 and 4.4 ± 0.2 10^6/ml, resp.; SGOT level, 75.7 ± 5.3 and 63.5 ± 15.6 IU/l, resp.; SGPT level, 37.7 ± 4.6 and 28.0 ± 4.3 IU/l, resp.; and iron level, 65.7 ± 26.5 and 62.4 ± 24.5 mg/dl, resp. Bone age retardation of -2.7 ± 1.9 and -5.3 ± 2.9 months in groups A and B, resp., was demonstrated. Stereomicroscopy of the intestinal mucosal biopsy specimens showed subtotal mucosal atrophy with ridges or convolutions, types II-c and II-c-d, in 9/18 patients in group A and in 10/30 patients in group B. Completely normal mucosa was never found. Liver involvement was excluded (normal SGPT values) and gut inflammation was confirmed (elevated SGOT values and study of biopsy material). Normal fecal flora were detected by bacteriological examination of the feces in all patients, but the total counts for both aerobic and anaerobic organisms in the patients were significantly ($p<0.01$) higher than normal, indicative of an altered ratio between the normal components of the fecal flora. A new diet was built up (polysaccharides, then proteins, disaccharides and dilute cow's milk); improvement began within 1 week. A normal diet, restricted only in high-fiber foods, was then adopted. Slow normalization of the stools occurred within 1-3 months, and weight and height approached normal at the end of 1 yr. After evaluation of the factors known to cause chronic inflammation after an acute infection, the authors conclude that the cause of persistent diarrhea in the patients was chronic inflammation due to the alteration of the intestinal microflora by inappropriate diet and therapy.

8566 THE GASTROINTESTINAL LESIONS IN LEUKEMIAS.

(Jpn.) Hiroshige, Y.; Matsumoto, N.; Suetsugu, N.; Miwa, S.; Kaku, T.; Sasaki, K.; *et al.* (Yamaguchi Univ. Sch. Medicine, Japan). *Jpn. J. Clin. Hematol.* 18(7):861-867; 1977.

Gastrointestinal lesions were studied at autopsy in 51 cases of leukemia. The lesions included leukemic infiltration, ulcers, necrosis, and hemorrhage. Leukemic infiltration generally did not produce ulceration. There appeared to be a higher incidence of multiple ulcers (47.7%) in patients who had undergone combination chemotherapy. There was a frequent association between oral ulceration and bacterial or fungal infection at the site of the ulcers in these cases. These observations suggest that steroid therapy, combined chemotherapy, and gastrointestinal infection could be etiologic factors in multiple ulceration. Six patients had shown acute abdominal symptoms, consisting of oral ulceration, melena, shock, and marked neutropenia, at the terminal stage of their illness. Ileocecal or large intestinal necrosis associated with ulceration, pseudomembrane formation, and bacterial and/or fungus infection was observed in these patients. Gastrointestinal lesions were the direct cause of death in a total of 10 patients, with 8 dying from massive gastrointestinal hemorrhage.

8567 MORPHOLOGIC AND FUNCTIONAL STUDY OF THE SMALL INTESTINE IN MARASMIC PATIENTS.

(Eng.) Fagundes Neto, U.; Wehba, J.; Patricio, F. R. S.; Machado, N. (Escola Paulista de Medicina, Rua Botucatu, 720, 04023, Sao Paulo, SP, Brazil). *Arq. Gastroenterol.* 14(4):241-248; 1977.

Jejunal morphology and small intestine function (absorbance of d-xylose, sucrose, lactose, and glucose) were studied in 22 children (3-36 months old) with marasmic malnutrition and chronic diarrhea (4 also had bronchopneumonia). Jejunal biopsy was performed after a minimum fast of 4 hr. The villus/crypt height ratio was used to classify the patients into four morphological classes (degree 0, I, II, or III) according to a published criterion; there were 2, 4, 14, and 2 patients in these categories, resp. An overall decrease in the number of villi was observed in 12 cases; in 6 cases, the epithelium had become cuboid and in 1 case, pseudostratified. The inflammatory infiltrate showed distinct degrees of alteration, but in all cases eosinophils were found on the lamina propria of the intestinal mucosa. The average values for d-xylose in the blood 1 and 2 hr after the patients had swallowed a d-xylose dose of 15 g/m^2 of body surface were 24.8 ± 9.2 and 28.0 ± 8.2 mg%; the dose was given after a minimum 4-hr fasting period. Also after a minimum 4-hr fast, overload tests for sucrose, lactose (2 g/kg body weight) and glucose (1 g/kg) were carried out on alternate days. Of 17 patients with normal sucrose and glucose absorption curves, 8 had normal lactose absorption curves and 9 had flat lactose absorption curves; 4 patients had normal glucose absorption curves but flat sucrose and lactose absorption curves; and the remaining patient had flat absorption curves for all three sugars. Three children died of complications (*Enterobacter* septicemia in 1 and bronchopneumonia in 2). This study has revealed morphologic functional alterations, termed "decreased villus population," similar to changes seen in kwashiorkor in children with marasmic malnutrition. The malabsorption of lactose in 73% of these patients emphasized the necessity of considering exclusion of cow's-milk formula during treatment. Intensive medical care and an adequate diet can reduce mortality and hospitalization time in these patients.

8568 THE ZOLLINGER-ELLISON SYNDROME. REPORT OF ONE CASE AND REVIEW OF THE LITERATURE.

(Fre.) Sarrazin, R.; Dyon, J. F.; Bost, M.; Rossignol, A. M.; Rachail, M.; Fournet, J.; *et al.* (Centre Hospitalier Universitaire de Grenoble, 38700 La Trouce, France). *Ann. Pediatr.* 53(12): 863-874; 1977.

A case is reported of a 9-yr-old girl with the Zollinger-Ellison (Z-E) syndrome that was revealed by a bleeding duodenal ulcer, and reports in the literature on 19 children under 15 yr of age with the Z-E syndrome are reviewed. The patient presented with episodic abdominal pain unrelated to meals. Initial x-ray studies and a laparotomy failed to disclose any abdominal pathology. An ulcer of the duodenum was revealed on barium tran-
sit studies taken after the patient had two episod
of vomiting with hematemesis. The Z-E syndrome w
identified by radioimmunoassay studies of plasma
gastrin performed after fasting, ingesting a high
protein meal, or receiving i.v. calcium (12 mg/kg)
A nontumorous hepatomegaly and the duodenal ulcer
were observed during a second laparotomy. At fir
the pancreas appeared normal, but careful exploration disclosed an enlarged lymph node on the posterior surface of the pancreas next to the duoden
A total gastrectomy and excision of the head of t
pancreas and adjoining duodenum were performed.
Histological examination of the excised pancreas
did not reveal any abnormal parenchyma; however,
the retropancreatic lymph nodes were invaded by
an islet cell tumor. Serum gastrin levels fell t
normal postoperatively, and 27 months later remai
low. The literature reports only 7/19 children
with Z-E syndrome with tumors located in the pancreas; other sites included lymph nodes (6), live
(8), and the gastrointestinal tract (2).

8569 IRON METABOLISM DURING PROTEIN-ENERGY MALNUTRITION IN CHILDREN. (Fre.) Fond

P.; Bouton, J. M.; de Maertelaere-Laurent, E.; Ma
delbaum, I. M. (Hopital Saint-Pierre, Rue Haute,
320, B 1000 Bruxelles, Belgium). *Nouv. Rev. Fr.*
Hematol. Blood Cells 18(1):5-21; 1977.

8570 QUANTITATIVE INVESTIGATIONS ON THE ENT
AL RESORPTION OF INHALED ALLERGENS.

(Ger.) Jorde, W.; Linsenmann, P.; Werdermann, K
Bohlmann, H. G. (Asthmakrankenhaus der Kamillian
Monchengladbach, W. Germany). *Z. Immunitaetsfor*
(Suppl. 2):135-138; 1977.

8571 EXUDATIVE GASTROENTEROPATHY REVEALING
ALLERGY TO CRUSTACEANS. (Fre.) Dulac

O.; Zamet, P.; Bonnefond, A. (Hopital d'enfants
Bicetre, F 94270 Bicetre, France). *Arch. Fr. Pe*
atr. 34(5):455-456; 1977.

8572 ENDOSCOPIC INJECTION OF SCLEROSING AG
FOR DIGESTIVE TRACT HEMOSTASIS. (Ger

Soehendra, N.; Knipper, A. (Chirurgische Klinik
und Poliklinik der Universitat, Martinistrasse
52, 2000 Hamburg 20, W. Germany). *Dtsch. Med.*
Wochenschr. 102(46):1688-1690; 1977.

8573 TACTICAL ERRORS IN SURGICAL MANAGEMEN
ACUTE UPPER GASTROINTESTINAL HEMORRHA

(Ger.) Schnetzer, J. (Krankenhaus der Barmherz
Schwestern, Liniengasse 19, A-1062 Vienna, Aust
Wien. Med. Wochenschr. 127(24):744-745; 1977.

8574 DRUG-INDUCED HEMORRHAGE OF THE UPPER
OF THE DIGESTIVE TRACT. (Fre.) Doff

M.; Coumaros, D.; Girard, M.; Krummel, Y.; Bock
R. (Centre Hospitalo-Universitaire de Strasbou
67005 Strasbourg Cedex, France). *Rev. Fr. Gas*
enterol. (134):23-28; 1977.

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(Rus.) Dorofeichuk, V. G. (Gorkii Scien-
c Res. Inst. Pediatrics, RSFSR Ministry Public
th, Gorkii, USSR). *Vopr. Okhr. Materin. Det.*
):58-60; 1977.

EFFECTIVENESS OF INTESTOPANE AND OTHER ETIOTROPIC DRUGS IN ACUTE DYSENTERY.
.) Chaitsev, V. G.; Chechel'nitskii, V. M.;
nt'ev, V. F. (Voronezh Medical Inst., Voronezh,
). *Sov. Med.* (11):149-151; 1977.

SIGNIFICANCE OF DETERMINATION OF DNA IN THE JEJUNUM CONTENTS FOR DIAGNOSIS OF
NIC ENTERITIS. (Rus.) Linevsky, Yu. V. (Dept.
apy, A. M. Gorkii Donetsk Medical Inst., Don-
, USSR). *Ter. Arkh.* 49(2):52-55; 1977.

X-RAY DIAGNOSIS OF CHRONIC NONSPECIFIC ENTEROCOLITIS. (Ger.) Frik, W.; Per-
hl, M. (Medizinische Fakultat, Rheinisch-West-
sche Technische Hochschule, Goethestrasse 27/
5100 Aachen, W. Germany). *Therapiewoche* 27(38):
-6690, *passim*; 1977.

CONSTIPATION IN CHILDREN. ITS TREATMENT WITH BRAN. (Fre.) Bargheon, J. (No
liation given). *Rev. Fr. Gastroenterol.* (132):
; 1977.

TREATMENT OF CONSTIPATION WITH BRAN CAKES. (Fre.) Choffe, R. (Clinique Saint-
nique, 71500 Louhans, France). *Rev. Fr. Gas-
nterol.* (134):5-7; 1977.

THERAPY FOR OBSTIPATION. (Ger.) Berg, H. (2357 Bad Bramstedt, W. Germany).
apiewoche 27(29):5353-5358; 1977.

THERAPEUTIC TRIAL WITH NITROXOLINE-CHARCOAL IN CERTAIN DIARRHEAS. (Fre.) Paris,
No affiliation given). *Rev. Fr. Gastroenterol.*
):65-71; 1977.

DIPHENOXINE HYDROCHLORIDE, A NEW ANTI-DIARRHEAL AGENT. (Ger.) Steffen, R.
tal Neumunster, Zollikerberg bei Zurich, Swit-
and). *Munch. Med. Wochenschr.* 120(2/3):73-74;

SALMONELLOSIS. (Ger.) Werner, G. T. (Bayerischen Landesimpfanstalt, Tropenmed.
tungsstelle, Am Neudeck 1, 8 Munich 95, W. Ger-
). *Fortschr. Med.* 95(36):2189-2194; 1977.

EPIDEMIOLOGICAL ASPECTS OF SALMONELLOSIS. (Ger.) Hupper, H. (Ministerium fur Ar-
, Gesundheit und Sozialordnung, Rotebuhlplatz 30, 7000 Stuttgart, W. Germany). *Therapiewoche* 27(29):5298-5303, *passim;* 1977.

8586 NOTES ON 560 CASES OF SALMONELLOSIS. (Ita.) Brunet, M. R.; Giachino, M.; Tapparo, D.; Marcer, I.; Vaccino, P. (Sch. Puericulture, Univ. Turin, Turin, Italy). *Minerva Pediatr.* 29(1):9-18; 1977.

8587 WIDESPREAD SALMONELLOSIS IN A PEDIATRIC WARD. OBSERVATION OF 261 CASES. (Fre.) Estavoyer, J. M.; Litzler, B.; Dupont, M. J.; Bruand, L.; Baufle, G. H.; Raffi, A. (Centre Hospitalier et Universitaire, 25000 Besancon, France). *Rev. Fr. Gastroenterol.* (130):15-28, *passim*; 1977.

8588 EPIDEMIOLOGICAL AND CLINICAL FEATURES OF Salmonella-INDUCED ENTERITIS. (Ita.) Rossolini, A.; Mattei, C.; Bianchini, A. M. (Istituto di Clinica delle Malattie Infettive dell'Universita di Siena, Siena, Italy). *Minerva Pediatr.* 29(1):1-7; 1977.

8589 PROBLEM OF CHRONIC CARRIERS IN Salmonella INFECTION. (Ger.) Petersen, K. F. (Zentralkrankenhaus Gauting, Unterbrunner Strasse 85, 8035 Gauting, W. Germany). *Therapiewoche* 27(29): 5304-5307, *passim*; 1977.

8590 CLINICAL-IMMUNOLOGICAL CHARACTERISTICS OF GASTROINTESTINAL SALMONELLOSIS IN CHILDREN OF DIFFERENT AGE GROUPS. (Rus.) Rumiantseva, T. A. (Dept. Infectious Diseases of Children, Central Inst. Postgraduate Medical Studies, USSR). *Pediatriia* (7):63-68; 1977.

8591 EFFECT OF AZAPROPAZONE ON THE GASTROINTESTINAL TRACT AND LIVER. (Ger.) Faust-Tinnefeldt, G. (Zentrum fur Rheumatologie, Medizinische Klinik, 6229 Schlangenbad, W. Germany). *Therapiewoche* 27(47):8567-8575, *passim;* 1977.

8592 METASTASES OF CYLINDROME OF THE SUBLINGUA GLAND TO THE SCALP. (Ger.) Reichelt, H. G.; Savaser, A. (Medizinische Hochschule Hannover, D-3000 Hannover 61, W. Germany). *Fortschr. Geb. Rontgenstr. Nuklearmed.* 128(1):96-97; 1978.

8593 GASTROENTERITIS IN ALICE SPRINGS. (Eng.) Gardiner, A. J. (Adelaide Children's Hosp
72 King William Rd., North Adelaide, South Australi
5006, Australia). *Med. J. Aust.* 4(2, Suppl.):6-10
1977.

8594 ONCOCYTOMA OF THE PAROTID GLAND WITH MALIGNANT CHANGE. (Eng.) Chu, W.; Strawitz, J. G. (American Oncologic Hosp., Central and Shelmire Ave., Philadelphia, PA 19111). *Arch. Surg.* 113(3):318-319; 1978.

8595 THE TOXICITY OF ETHANOL. A TENTATIVE RISK EVALUATION. (Eng.) Rydberg, U.; Skerfving, S. (Karolinska Institutet, S-104 01 Stockholm, Sweden). *Adv. Exp. Med. Biol.* 85b:403-419; 1977.

8596 ERRORS IN REPORTING CANCER AND OTHER CONDITIONS BY PERSONS IN A PROSPECTIVE STUDY. (Eng.) Aono, J.; Nomura, A. (Kuakini Medical Center, Honolulu, HI). *Publ. Health Rep.* 93(1):11-15; 1978.

8597 ENTEROVIRAL DISEASE IN EARLY INFANCY. (Eng.) Morens, D. M. (Viral Diseases Div., Building 1, Room 6124, Bureau Epidemiology, Center Disease Control, Atlanta, GA 30333). *J. Pediatr.* 92(3):374-377; 1978.

See also, 8017, 8137, 8140, 8142, 8153, 8155, 8163, 8167, 8172, 8173, 8180, 8194, 8212, 8217, 8228, 8248, 8298, 8302, 8318, 8328, 8355, 8365, 8372, 8384, 8396, 8410, 8432.

GENERAL

Parasitology

8598 THE ENZYME-LINKED IMMUNOSORBENT ASSAY (ELISA) IN THE DIAGNOSIS OF AMOEBIASIS. (Ita.) Sorice, F.; Delia, S.; Vullo, V.; Ferone, U. (Istituto di Clinica delle Malattie Tropicali e Infettive, Universita di Roma, Roma, Italy). *Ann. Sclavo* 19(3):484-489; 1977.

The application of the new serological method, the enzyme-linked immunosorbent assay (ELISA), in the detection of *Entamoeba histolytica* antibodies is reported for 39 subjects (15 harboring *E. histolytica* trophozoites, 6 with acute enteric symptomatology of undiagnosed cause, 8 with other parasitic infections, and 10 healthy individuals). The test is performed by incubating dilute antigen with the serum to be tested for 3 hr at 37 C. A total human antiglobulin antiserum conjugated with alkaline phosphatase is added followed by the enzyme and, in approximately 15-30 min, positive sera are distinguished by their intense yellow color. The results are evaluated with a spectrophotometer. Of sera from 15 patients with *E. histolytica* trophozoites, the optical density (O.D.) values were 0.42-0.80 in 9 cases and 0.81-0.90 in 6 cases (the average value for this group was 0.70). In six patients with enteric symptoms, the O.D. values were 0.15-0.20 with a median value of 0.17. The eight patients with other parasitic infections had O.D. values of 0.12-0.20 with an average value of 0.18. The average O.D. value of the control group was 0.12. The differences in the values between those with *E. histolytica* infections, those with other infections, and the control group were statistically significant ($p<0.001$). It is concluded that the ELISA is useful in the diagnosis of *E. histolytica* infections.

8599 COMPARATIVE EVALUATION OF TINIDAZOLE AND METRONIDAZOLE IN THE TREATMENT OF AMOEBIC LIVER ABSCESS. (Eng.) Kundu, S. C.; Sen, A.; Bhattacherjee, T. D.; Dasgupta, D. P.; Majumdar, S.; Mookerjee, P. K.; *et al.* (Singh Hosp., E. Rly. Calcutta, India). *J. Indian Med. Assoc.* 69(6):127-129; 1977.

A randomized comparative clinical study of tinidazole (T) and metronidazole (M) in comparable cases of amebic liver abscess was carried out to evaluate objectively the therapeutic effect of, tolerance to, and acceptability of each drug. Patients with clinical features of liver abscess bu without serious complications and not moribund were selected for the study; further, these subjects either had not received or had failed to respond to any anti-amebic drug during the previous month. Nine patients each received either T or M (2 g once daily for 3 days, p.o., for both drugs) chloroquine, and/or emetine HCl, if necessary, to obtain a cure, and supportive nonspecific treatme as needed. Clinical assessment was carried out prior to and on the 5th, 10th, and 30th days afte treatment; therapeutic response was graded excellent, good, fair, or poor according to rapidity of response to the test drug, time until clinical cure, and need for auxiliary specific and/or nonspecific treatment. The responses to T were significantly different from those to M (excellent, and 2; good, 1 and 1; fair, 0 and 0; poor, 1 and resp., $p<0.05$ for excellent and good versus fair poor). One patient in each test group died. One tient in the T group and four in the M group complained of side-effects (anorexia in both groups nausea, giddiness, headache, and sleeplessness i the M group). Tinidazole is superior to metroni zole, and therefore is the drug of choice, in tr ing uncomplicated amebic liver abscess.

8600 BILIARY ASCARIASIS. (Eng.) Arcilla, C. A.; Varilla, A. (Ramon Magsaysay Me orial Medical Center, Quezon City, Philippines). *Drugs* 15(Suppl. 1):104-110; 1978.

1 TINIDAZOLE IN THE TREATMENT OF TRICHOMONIASIS, GIARDIASIS AND AMOEBIASIS: PORT OF A MULTICENTRE STUDY. (Eng.) Apte, V. Packard. R. S. (Medical Dept., Pfizer Asia, .O. Box 573, Hong Kong). *Drugs* 15(Suppl. 1): 48; 1978.

2 HOW DOES TINIDAZOLE COMPARE WITH METRONIDAZOLE? A SUMMARY REPORT OF INDIAN ALS IN AMOEBIASIS AND GIARDIASIS. (Eng.) shi, J. S.; Ghiara, J. M.; Nanivadekar, A. S. izer Ltd., Express Towers, Nariman Point, bay 400 021, India). *Drugs* 15(Suppl. 1):33- 1978.

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8605 TREATMENT OF AMOEBIC LIVER ABSCESS WITH TINIDAZOLE AND METRONIDAZOLE. (Eng.) Khokhani, R. C.; Garud, A. D.; Deodhar, K. P.; Sureka, S. B.; Kulkarni, M.; Damle, V. B. (Lokmanya Tilak Municipal Medical Coll. and Hosp., Bombay, India). *Drugs* 15(Suppl. 1):23-25; 1978.

8606 A COMPARATIVE STUDY OF TINIDAZOLE AND METRONIDAZOLE AS A SINGLE DAILY DOSE FOR THREE DAYS IN SYMPTOMATIC INTESTINAL AMOEBIASIS. (Eng.) Misra, N. P. (Gandhi Medical Coll., Bhopal 462 002, India). *Drugs* 15(Suppl. 1):19-22; 1978.

See also, 7999, 8100, 8139, 8267, 8339, 8371, 8593.

GENERAL

Regional Enteritis

CROHN'S DISEASE: A LONG-TERM STUDY OF THE CLINICAL COURSE IN 186 PATIENTS. .) Bergman, L.; Krause, U. (Univ. Hosp., Upp-, Sweden). *Scand. J. Gastroenterol.* 12(8): 944; 1977.

ries of 186 patients with Crohn's disease ted during the period 1956-1968 was followed During the follow-up period, 177 patients undergone resection or bypass surgery. The observation time in these patients was 10.5 The overall recurrence rate after resection 51%. Radical resection (i.e., all affected s resected together with a margin of at least m of microscopically normal tissue) was carried in 84 patients, and the recurrence rate was Among the 57 patients who underwent non-cal resection (i.e., all diseased bowel was removed or else a disease-free margin of less 10 cm on either side of the resection re-ed), the recurrence rate was 84%. Patients had undergone a primary radical resection ed fewer re-operations and had fewer recur-es and a better quality of life than patients a nonradical first operation. The total ality in operations or due to complications rohn's disease was 5.4%. The mortality in ection with the operative procedure was 3.4%. general health of the 165 patients examined in 1975 was estimated: 87% were in very good general health, 9.1% had moderate subjective symptoms, and 3.6% had pronounced subjective symptoms.

8608 REGIONAL ENTERITIS IN CHILDREN: CLINICAL AND ROENTGEN FEATURES. (Eng.) Franken, E. A., Jr.; Smith, J. A.; Fitzgerald, J. R. (Indiana Univ. Sch. Medicine, Indianapolis, IN). *CRC Crit. Rev. Diagn. Imaging* 10(2):163-185; 1977.

A study of regional enteritis (RE) or Crohn's disease diagnosed in 36 children at Riley Children's Hospital of Indiana University is presented. The clinical manifestations of the disease, type of involvement, gastrointestinal and systemic complications, roentgenology, and problems of differential diagnosis in these children and in 268 pediatric RE cases in the literature are compared and frequently contrasted with related findings in over 600 adult RE cases in the literature. About one-third of the 36 children initially presented systemic problems such as arthritis (3), growth failure (2), fever of unknown origin (4), anorexia nervosa (2), and other nongastrointestinal problems (3). Nonspecific abdominal pain occurred in over 80% of the cases. The disease was limited to the small bowel in 13 of the children and in 4 of these there was no involvement of the terminal ileum. Nine of the 36 had isolated colon involvement. The authors emphasize that in a child with gastrointestinal symptoms requiring roentgenographic investigation, it is of greater importance to examine the small bowel and colon for possible RE than to examine for duodenal and gastric ulcer. Where RE is suspected, a complete roentgenographic evaluation including standard barium studies of the stomach, small bowel, and colon are indicated initially with retrograde small bowel examination to confirm the diagnosis in borderline cases and to assess the extent of involvement. Once the diagnosis of RE is established, techniques of examination can be modified to reduce radiation exposure.

8609 ISOLATED COLONIC CROHN'S DISEASE: CLINICAL, RADIOLOGICAL, AND ENDOSCOPIC ASPECTS, DIAGNOSIS, AND EVOLUTION.

(Fre.) Julien, M.; Vignal, J. (Hopital Henri-Mondor, Creteil, France). *Rev. Prat.* 27(55):3817-3834, *passim*; 1977.

Various aspects of Crohn's disease (CD) are reviewed. Colonic CD can be segmental, multisegmental, or diffuse. The rectum is involved together with other areas of the colon in 35-40% of cases. Rectal involvement alone is exceptional and occurs in only 2-3% of cases. Diarrhea accompanied by abdominal cramps, and sometimes containing pus, are the usual clinical signs. Rectal bleeding is much more likely to occur with rectal involvement. Differential diagnosis of CD and other colitis, particularly ulcerative colitis, is discussed. Barium transit x-ray studies identify the type of lesions (ulcerations, "thumb-print" lacunae) and site of lesions (right colon, ileum). X-ray often fails to identify rectal lesions, which can be found by endoscopic examination and biopsy. The evolution of the disease is highly variable and difficult to predict. Complications such as occlusions, fistulae, abscesses, and colectasia occur frequently, and surgery may be required; however, pathology will recur in 50% of patients.

8610 DETERMINATION OF THE FAECAL EXCRETION OF LABELLED BILE SALTS AFTER I.V. ADMINISTRATION OF ^{14}C-CHOLIC ACID: AN EVALUATION OF THE BILE SALT MALABSORPTION BEFORE AND AFTER SURGERY IN PATIENTS WITH CROHN'S DISEASE.

(Eng.) Andersson, H.; Filipsson, S.; Hulten, L. (Sahlgrenska sjukhuset, S-413 45 Goteborg, Sweden). *Scand. J. Gastroenterol.* 13(2):249-255; 1978.

The value of a recently described technique for determining fecal bile salt loss in the study of ileal function was assessed. By measuring total fecal radioactivity, correlated to 24-hr enterohepatic circulation, following the i.v. administration of ^{14}C-cholic acid, bile salt malabsorption was evaluated before and/or after surgery in 80 patients with ileal or colonic Crohn's disease, and the results were related to the length of ileum diseased or resected. Before surgery, bile salt malabsorption was observed only in nine patients with terminal ileal inflammation, but no significant correlation was found between bile salt excretion and the extent of ileal disease. Twenty-one patients with ileal, 36 patients with ileocolic, and 9 patients with colonic disease were investigated after surgery. The percentage of administered bile salt excreted in the feces correlated well with the length of ileum resected ($r=0.79$, $p<0.001$). The correlation between fecal bile salt level and the length of the resected segment expressed in percentage of total small bowel length was of the same magnitude ($r=0.80$, $p<0.001$). The correlation between bile salt malabsorption and the length of ileal segment resected was about the same in ileostomy patients and in patients subjected to restorative operation. In 19 patients investigated both pre- and postoperatively, it was possible to compare directly the magnitude of the bile salt loss caused by the ileal disease and that caused by the resection. Irrespective of the preoperative level, the small bowel resection resulted in an increased loss of bile salts ($p<0.001$ When a similar comparison was made for fecal fat excretion and the results of the Schilling test, the results were less consistent. Three ileal function tests were carried out in 50 patients wit malabsorption due to resection of less than 10 cm of ileum. The Schilling test gave abnormal result in only 48%, whereas a fecal fat excretion test confirmed malabsorption in 64%, and the fecal bile salt test gave results indicative of malabsorption in 96%. The agreement between the three tests improved in patients with ileal resections of more than 60 cm. It is concluded that the determinatio of fecal ^{14}C-cholic acid is a more sensitive test than the Schilling test or the fecal fat excretion test, at least in those patients with ileal dysfunction due to ileal resection.

8611 TREATMENT OF CROHN'S DISEASE IN THE CHILD. 12 CASES.

(Fre.) Navarro, J.; Fontaine, J. L.; Mathe, J. C.; Girardet, J. P.; Pernin, P.; Mougenot, J. F.; *et al.* (Hopital Trousseau, 24 av. du Dr. A. Netter, F 75012, Pari France). *Nouv. Presse Med.* 7(3):183-188; 1978.

The results of the treatment of Crohn's disease i 12 children (7 boys, 5 girls; age range 6-17 yr) are reported. In the five patients treated prior to 1974, treatment consisted of a low-residue die milk deprivation, and sometimes i.v. feeding. Sa azosulfapyridine (100 mg/kg/day) and corticostero therapy (1.5-3 mg/kg/day) for 15 days/month were prescribed for four of five patients. Three of t five patients eventually required surgery because stenosis (2) or fistula (1). The more recently treated group of seven patients were fed by i.v. and/or constant-rate enteral feeding regimens for periods of 15-22 days and 15-510 days (average 12 days), resp. Constant-rate nutrition by gastric intubation was possible with the patient at home in three cases by use of portable pump. A low-residue, hypoallergenic diet was instituted at th end of parenteral and/or enteral feeding. Salazo sulfamide (100 mg/kg/day), metronidazole (20 mg/k and levamisole (3 cases only, dose not specified) were prescribed for these patients. Five of the ven patients in the recently treated group, follo ore than 1 yr, demonstrated a rapid weight gain, pearance of diarrhea and cramps, healing of muco- issures and anorectal fistulas, and in one case, pearance of duodenal stenosis. Enteral feeding ot well tolerated by adolescents in the group; er, children were more likely to accept medi- ns and protein hydrolysates by this route.

RESULTS OF TREATING THE ACUTE STAGE OF CROHN'S DISEASE BY A DIETARY REGIMEN.) Fromm, H.; Gebel, M.; Schroeter, U.; Canz- H.; Schmidt, W. (Medizinische Hochschule, Wiechert-Allee 9, 3000 Hannover 61, W. Ger- . *Dtsch. Med. Wochenschr.* 103(9):377-380;

ffectiveness of diet treatment during the phase of Crohn's disease (CD) was studied series of 23 patients. Fifteen patients ved at first exclusively parenteral feeding 0 kcal/day; 20% amino acids, 25% fats, 55% hydrates); the others received a balanced etic diet (Vivasorb) through a nasoduodenal . A low-residue diet was then introduced ally in all patients. The cardinal symptoms such as severe abdominal pain, diarrhea, plete ileus, and weight loss, responded ably in all patients. Postoperative fistulae d in two of three patients, but enterocutan- fistulae remained open in all of five patients, ugh the volume of secretion decreased dis- ly in four. During the follow-up (1-24 months, ge 9 months), the symptoms recurred in five nts, necessitating operative treatment in . The results indicate that diet treatment is an effective therapy.

THE DILEMMA OF CROHN'S DISEASE: LONG-TERM FOLLOW-UP OF CROHN'S DISEASE OF THE INTESTINE. (Eng.) Stone, W.; Veidenheimer, ; Corman, M. L.; Coller, J. A. (Lahey Clinic ation, 605 Commonwealth Ave., Boston, MA). *Dis. Colon Rectum* 20(5):372-376; 1977.

CROHN'S DISEASE OF THE DUODENUM [Abstract]. (Eng.) Anonymous. (No affiliation given). *ed. J.* 2(6082):282; 1977.

8615 RECTAL BIOPSY IN CROHN'S DISEASE [Abstract]. (Eng.) Hill, R. B.; Kent, T. H.; Hansen, R. (Upstate Medical Center, IA). *Gastroenterology* 72(5, Part 2):1069; 1977.

8616 ABNORMAL JEJUNAL SURFACE pH IN CROHN'S DISEASE--NEW EVIDENCE THAT CROHN'S DISEASE IS A DIFFUSE LESION OF THE GASTROINTESTINAL TRACT [Abstract]. (Eng.) Cooper, B. T.; Lucas, M. L.; Lei, F. H.; Blair, J. A.; Cooke, W. T. (General Hosp., Birmingham, England). *Gut* 18(5):A423; 1977.

8617 BONE HISTOLOGY AND VITAMIN D STATUS IN CROHN'S DISEASE (CD): ASSESSMENT OF VITAMIN D THERAPY [Abstract]. (Eng.) Driscoll, R.; Meredith, S.; Wagonfeld, J.; Rosenberg, I. (Dept. Medicine, Univ. Chicago, Chicago, IL). *Gastroenterology* 72(5, Part 2):1051; 1977.

8618 THYMOSIN EFFECT ON 'ACTIVE' T-LYMPHOCYTES IN CROHN'S DISEASE [Abstract]. (Eng.) Dopp, A. C.; Goldstein, A. L.; Mutchnick, M. G. (Dept. Internal Medicine, Univ. Michigan, Ann Arbor, MI). *Gastroenterology* 72(5, Part 2):1051; 1977.

8619 RENAL TUBULAR ACIDOSIS SUPERIMPOSED ON THE "SHORT BOWEL" SYNDROME IN CROHN'S DISEASE [Abstract]. (Eng.) Singh, P.; Katz, S.; Katzka, I. (Long Island Jewish-Hillside Medical Center, New Hyde Park, NY). *Gastroenterology* 72(5, Part 2): 1132; 1977.

See also, 8143, 8304, 8348, 8349, 8388, 8391, 8395.

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

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GASTROENTEROLOGY ABSTRACTS and CITATIONS is published monthly and includes citations and abstracts from the biomedical world literature as they are currently received. In addition, yearly cumulated subject and author indexes are published.

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The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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LANGUAGE ABBREVIATIONS

Afrikaans	Afr.	Georgian	Geo.	Persian	Per.
Albanian	Alb.	German	Ger.	Polish	Pol.
Arabic	Ara.	Greek	Gre.	Portuguese	Por.
Armenian	Arm.	Hausa	Hau.	Pushto	Pus.
Azerbaijani	Aze.	Hebrew	Heb.	Rumanian	Rum.
Belorussian	Bel.	Hindi	Hin.	Russian	Rus.
Bengali	Ben.	Hungarian	Hun.	Serbian	Ser.
Bulgarian	Bul.	Icelandic	Ice.	Slovak	Slo.
Burmese	Bur.	Indonesian	Ind.	Slovene	Slv.
Chinese	Chi.	Interlingua	Int.	Spanish	Spa.
Croatian	Cro.	Italian	Ita.	Swahili	Swa.
Czechoslovakian	Cze.	Japanese	Jpn.	Swedish	Swe.
Danish	Dan.	Kirghiz	Kir.	Tagalog	Tag.
Dutch	Dut.	Korean	Kor.	Tamil	Tam.
English	Eng.	Latin	Lat.	Telugu	Tel.
Esperanto	Esp.	Latvian	Lav.	Thai	Tha.
Estonian	Est.	Lithuanian	Lit.	Turkish	Tur.
Finnish	Fin.	Marathi	Mar.	Ukranian	Ukr.
Flemish	Fle.	Masai	Mas.	Urdu	Urd.
French	Fre.	Multilingual	Mlt.	Vietnamese	Vie.
Gaelic	Gae.	Norwegian	Nor.	Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
amp	ampere
ATP	adenosine triphosphate
A	angstrom
BSP	sulfobromophthalein
C	degrees centigrade
cal	calories
cc	cubic centimeter
cm	centimeter(s)
dl	deciliter
DNA	deoxyribonucleic acid
ED_{50}	median effective dose(s)
EDTA	ethylenediamine tetraacetic acid
e.g.	for example
EEG	electroencephalogram
ESR	erythrocyte sedimentation rate
g	gram(s)
µg	microgram(s)
Hz	Hertz
hr	hour(s)
Ig	immunoglobulin(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kcal	kilocalorie(s)
kg	kilogram(s)
K_m	Michaelis constant
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar; mole(s)
mM	millimolar; millimole(s)
µM	micromolar; micromole(s)
ma	milliampere(s)
mCi, µCi	milli-, microcurie(s)
mEq	milliequivalent(s)
mg	milligram(s)
ml, µl	milli-, microliter(s)
mm	millimeter(s)
mOsm	milliosmolar; milliosmeter(s)
msec	millisecond(s)
mV	millivolt(s)
min	minute(s)
MTD	maximum tolerated dose
NAD	nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotidephosphate
NADPH	reduced nicotinamide adenine dinucleotidephosphate
ng	nanogram (10^{-9})
nm	nanometer(s)
Pa	ambient pressure
PAS	periodic acid - Schiff
pg	picogram (10^{-12})
pgEq	picogram equivalent(s)
p.o.	orally
ppb	parts per billion
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
V	volt
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

620 CHARACTERIZATION OF COLUMNAR ABSORPTIVE EPITHELIAL CELLS ISOLATED FROM RAT JEJUNUM.

Eng.) Towler, C. M.; Pugh-Humphreys, G. P.; Por-
eous, J. W. (Dept. Biochemistry, Univ. Aberdeen,
berdeen AB9 1AS, Scotland). *J. Cell Sci.* 29:53-75;
978.

comprehensive qualitative and quantitative assess-
ent of the origin, the yield, and the biochemical
ntegrity of cells isolated from rat jejunum was
arried out. Cell isolation yielded cells that were
early all structurally intact, that represented the
hole of the population of cells originally present on
he walls of the villi of rat jejunum, and that were
lmost all columnar absorptive cells; the only other
ells present (in small numbers) were goblet cells and
BC. One possible reservation about the integrity of
he isolated columnar absorptive cells arose from the
bservation that some cells contained many more vac-
oles, especially in the supranuclear region, than
ould be expected from examination of sections of
imilar cells *in situ* in the intact intestine. The
solated cells retained a number of solutes (ortho-
hosphate, ATP, ADP, AMP, lactate) at intracellular
oncentrations exceeding those of the solutes in the
ncubation medium; each of these test solutes would be
xpected to pre-exist in the isolated cells or to be
enerated intracellularly during incubation. A
umber of solutes (α-methyl-D-glucoside, 3-*O*-
ethyl-D-glucose, D-galactose, L-valine, L-
eucine) were translocated from the incubation
edium into the cell and accumulated there at
concentration exceeding that found in the
edium. Two inhibitors of fatty acid catabolism
2-bromo-hexanoic acid and 4-pentenoic acid) failed
o prevent intracellular accumulation of α-methyl-
-glucoside, possibly indicating that the accumula-
ion process is independent of fatty acid catabolism
r that these inhibitors failed to penetrate the
solated cells. All other inhibitors tested (oua-
ain, cyanide, dinitrophenol, phlorhidzin, and
arbonyl-cyanide-*m*-chlorophenyl-hydrazine) had the
ame effects on α-methyl-D-glucoside accumulation
s would be expected from observations with more
omplex preparations of intestine. The failure of
uabain to give complete inhibition of intracellu-
ar methylglucoside accumulation suggested that
hese cells contain an ouabain-insensitive Na^+-de-
endent ATPase similar to that found in other tis-
ues. Isolated cells respired at a steady rate
18.6 ± 0.9 μmol O_2/hr/mg cell DNA) using endogenous
ubstrates; the addition of 5 mM L-glutamine stimu-
ated respiration (to 25 μmol O_2/hr/mg cell DNA),
pporting the previous suggestion that plasma glu-
mine might be an important respiratory substrate
r intestine. The addition of D-glucose stimulated
espiration and gave rise to increased lactic acid
oduction. Extracellular L-valine was incorporated
to cell protein. Intracellular ATP, ADP, and AMP
vels could be held constant, or changed in a pre-
ctable way. The observations suggest that
olated and incubated cells could be valuable for
e further exploration of the biochemical func-
ons of the small intestine.

8621 ULTRASTRUCTURAL MORPHOMETRIC INVESTIGATIONS ON NORMAL HUMAN LIVER BIOPSIES.

(Eng.) Roessner, A.; Kolde, G.; Stahl, K.; Blanke, G.; van Husen, N.; Themann, H. (Lehrstuhl fur Medizinische Cytobiologie der Universitat, Westring 3, 4400 Munster, W. Germany). *Acta Hepatogastroenterol.* 25(2):119-123; 1978.

Morphometric ultrastructural evaluations of liver needle biopsies from 14 normal human subjects were carried out to obtain baseline data for comparative purposes and to determine whether such evaluations yield reliable results in spite of the higher range of distribution in this material compared with experimental liver material. The data were related to one of two reference systems: (1) unit volume of liver tissue or (2) unit volume of hepatocytes. Liver tissue volume was subdivided into sinusoid volume (0.211 ± 0.025 ml/ml liver tissue), hepatocyte volume (0.785 ± 0.025 ml/ml), and bile canalicular volume (0.0043 ± 0.0005 ml/ml). The hepatocyte cytoplasm accounted for most of the hepatocyte volume (0.729 ± 0.025 ml/ml), while the number of hepatocyte nuclei was 123.02 ± 8.20 x 10^6/ml liver tissue. The surface area of bile canaliculi was estimated to be 0.0508 ± 0.0042 m^2/ml liver tissue (a minimum estimate). The hepatocyte volume contained 0.076 ± 0.003 ml/ml nuclei, 0.924 ± 0.003 ml/ml cytoplasm, 0.138 ± 0.005 ml/ml mitochondria, 0.0099 ± 0.0006 ml/ml microbodies, 0.0045 ± 0.0013 ml/ml fat inclusions, and 0.0056 ± 0.0017 ml/ml lysosomes. There were 201 ± 14 x 10^9 mitochondria/ml hepatocytes (with inner and outer mitochondrial membrane surface areas of 2.171 ± 0.134 and 1.162 ± 0.056 m^2/ml hepatocytes, resp.) and 55.49 ± 2.39 x 10^9 microbodies/ml hepatocytes. The surface area of rough and smooth endoplasmic reticulum was 1.713 ± 0.140 and 1.981 ± 0.003 m^2/ml hepatocytes. The standard error of nearly all tested parameters was less than 10% of the mean, indicating that ultrastructural morphometric evaluations of normal human liver biopsy samples yield reliable results.

8622 LIGHT AND ELECTRON MICROSCOPIC HISTOCHEMISTRY OF THE SEROUS SECRETORY GRANULES IN THE SALIVARY GLANDULAR CELLS OF THE MONGOLIAN GERBIL (Mongolian meridianus) AND RHESUS MONKEY (Macaca irus).

(Eng.) Ichikawa, M.; Ichikawa, A. (Yokohama City Univ. Sch. Medicine, Yokohama 232, Japan). *Anat. Rec.* 189(1):125-139; 1977.

8623 MORPHOLOGY OF RESTING AND STIMULATED DISPERSED OXYNTIC CELLS.

(Eng.) Lechago, J. (Harbor General Hosp., 1000 W. Carson St., Torrance, CA 90509). *Gastroenterology* 73(4, Part 2): 958; 1977.

8624 CURRENT CONCEPTS OF LIVER STRUCTURE AS RELATED TO FUNCTION.

(Eng.) Jones, A. L.; Schmucker, D. L. (Veterans Admin. Hosp., San

Francisco, CA). *Gastroenterology* 73(4, Part 1): 833-851; 1977.

8625 MORPHOLOGY OF THE GUT ASSOCIATED LYMPHOID SYSTEM IN HEALTH AND DISEASE: A REVIEW. (Eng.) Whitehead, R.; Skinner, J. M. (Flinders Medical Center, Bedford Park, South Australia 5042, Australia). *Pathology* 10(1):3-16; 1978.

8626 LIGHT AND SCANNING ELECTRON MICROSCOPIC OBSERVATIONS OF THE EFFECTS OF SUBLETHAL DOSES OF METHOTREXATE ON THE RAT SMALL INTESTINE. (Eng.) Jeynes, B. J.; Altmann, G. G. (Health Sciences Center, Univ. Western Ontario, London, Ontario N6A 5C1, Canada). *Anat. Rec.* 191(1):1-17; 1978.

8627 MOTOR INNERVATION OF THE STRIATED OESOPHAGUS MUSCLE: PART 1. INTRAMURAL DISTRIBUTION OF THE RIGHT AND LEFT VAGUS NERVE IN THE RAT OESOPHAGUS AS REVEALED BY THE GLYCOGEN DEPLETION TECHNIQUE. (Eng.) Gruber, H. (II. Anatomisches Institut der Universitat Wien, A-1090 Vienna, Austria). *J. Neurol. Sci.* 36(1):41-53; 1978.

8628 THE THREE-DIMENSIONAL FINE STRUCTURE OF THE LIVER AS REVEALED BY SCANNING ELECTRO MICROSCOPY. (Eng.) Motta, P. M. (Faculty Medicine Univ. Rome, Rome, Italy). *Int. Rev. Cytol.* (Suppl. 6):347-399; 1977.

8629 STRUCTURE AND FUNCTION OF GUT ENDOCRINE CELLS. (Eng.) Fujita, T.; Kobayashi, S. (Niigata Univ. Sch. Medicine, Niigata, Japan). *Int. Rev. Cytol.* (Suupl. 6):187-233; 1977.

See also, 8665, 8680, 8720, 8745, 8761, 8773, 8823, 9127, 9205.

ABSORPTION - EXCRETION - TRANSPORT

8630 SIMILARITY IN EFFECTS OF Na^+ GRADIENTS AND MEMBRANE POTENTIALS ON D-GLUCOSE TRANSPORT BY, AND PHLORIZIN BINDING TO, VESICLES DERIVED FROM BRUSH BORDERS OF RABBIT INTESTINAL MUCOSAL CELLS. (Eng.) Toggenburger, G.; Kessler, M.; Rothstein, A.; Semenza, G.; Tannenbaum, C. (Laboratorium fur Biochemie, Eidgenossische Technische Hochschule, Universitatsstrasse 16, CH 8092 Zurich, Switzerland). *J. Membr. Biol.* 40(3):269-290; 1978.

To elucidate the role of Na^+, Na^+ gradients, electrical potentials, and anion substitution on sugar transport and on phlorizin binding, kinetic studies were conducted in vesicles derived from brush borders of rabbit intestinal mucosal cells. Phlorizin (20 and 100 mM) strongly inhibited D-glucose (30 μM) uptake by the vesicles under a 100 mM inward NaSCN gradient. Under equilibrium conditions, a large amount of low affinity phlorizin binding to intestinal brush border vesicles was observed, but there was no evidence of a high affinity component that could be correlated with the high inhibitory potency of the phlorizin. In the presence of a transmembrane NaSCN gradient, the rapid high affinity binding of phlorizin was observed within 1 sec. D-glucose abolished the high affinity component to the extent of about 80%; low affinity binding was not significantly reduced by D-glucose. Phlorizin binding was markedly reduced by substitution of NaCl for NaSCN or by allowing the vesicles to equilibrate in NaSCN for 1 hr before the addition of phlorizin. Phlorizin binding was increased twofold by a 90 mM choline thiocyanate gradient in the absence of a Na^+ gradient. However, in the absence of Na^+, no increase in D-glucose transport or in phlorizin binding was observed. The involvement of the small intestinal Na^+-dependent monosaccharide transporting system in the high affinity phlorizin binding was demonstrated and phlorizin was shown to be a fully competitive inhibitor of the monosaccharide transport process. The effect of the potential gradient ($\Delta\psi$), studied independent of an inward Na^+ gradient, showed $\Delta\psi$ to be a necessary factor in determining high affinity glucose-protectable phlorizin binding, but Na^+ must also be present. Furthermore, Na^+ alone without $\Delta\psi$ does not produce optimal high affinity glucose-protectable phlorizin binding. Three models attempting to integrate $\Delta\psi$ and Na^+-dependen of high affinity phlorizin binding with the mechanism of Na-dependent monosaccharide transport are proposed. The available experimental evidence doe not favor any one of these models. The complex nature of the phlorizin dissociation function was shown was well as the importance of the

erimental conditions in its determination. Both
presence of Na^+ and of an electrical trans-
brane potential difference are required for op-
al D-glucose-protectable phlorizin binding to
sh border membranes from rabbit small intestine.
orizin is bound to the D-glucose transporting
tein.

1 EFFECT OF ANIONS ON AMILORIDE-SENSITIVE,
ACTIVE SODIUM TRANSPORT ACROSS RABBIT
ON, IN VITRO: EVIDENCE FOR "TRANS-INHIBITION"
THE Na ENTRY MECHANISM. (Eng.) Turnheim, K.;
zzel, R. A.; Schultz, S. C. (Univ. Pittsburgh,
. Medicine, Pittsburgh, PA 15261). *J. Membr.*
l. 37(1):63-84; 1977.

effects of replacing Cl with sulfate, isethio-
e, hydroxypropane-sulfonate (HPSA), ethane-sul-
ate (ESA), or *p*-phenolsulfonate (PSA) on active
nsport (J_{net}^{Na}) were investigated in strips of
bit descending colon. Replacement of 107 mM
in the bathing solutions with isoosmolar sulfate,
thionate, HPSA and, to a lesser degree, ESA stimu-
ed J_{net}^{Na} when the basolateral pump mechanism was
saturated. These effects were rapid in onset
were readily reversible. These stimulatory
ons decreased the resistance of the amiloride-
sitive Na entry step at the mucosal membrane.
ever, when the active Na pump mechanism at the
olateral membrane was saturated, the stimulatory
ons did not decrease the resistance of the Na
ry process. These findings suggest the presence
a negative feedback system between the activity
the pump mechanism and the resistance of the Na
ry step, which may be mediated by the size of
intracellular Na transport pool. In other words,
seems that when the basolateral pump is operat-
at its maximal rate, the resistance to Na entry
ss the mucosal membrane through the amiloride-
sitive pathway is at a minimum and cannot be
ther decreased.

2 REVERSIBLE INHIBITION OF SODIUM ABSORP-
TION IN THE RAT COLON BY LOW pH: A MECH-
SM FOR DIARRHEA. (Eng.) Chung, R. S.; Johnson,
M. (Veterans Admin. Hosp., Iowa City, IA). *Surg.*
um 28:435-437; 1977.

effect of acidic pH on ion transport *in vivo*
studied in male Sprague-Dawley rats in which
cm of proximal colon were cannulated and per-
ed after the rats had been injected with keta-
e (40 mg/kg, i.m.). The pH of the perfusate
6.7-7.1 (control), 4.5, 3.0, 2.3, or 2.0. Net
fluxes were measured. H^+ disappearance was
early related to luminal pH (r=0.942, p<0.001).
net absorption of Na^+ and Cl^- and the volume
rption observed in the controls was decreased
reversed by decreasing pH; net secretion of Na^+
observed below pH 3 (p<0.01), net secretion of
began between pH 3.0 and pH 2.3, and net volume
retion was observed below pH 4.5 (p<0.01). His-
gical studies showed that structural damage of
rficial cells occurred with increasing severity
H decreased, beginning at pH 3. The initial
potential difference (PD) was greater at lower pH; PD decreased slowly during all experiments, with larger decreases at lower pH. It is suggested that PD may account for the major portion of H^+ movement, that net Na^+ movement may occur passively by paracellular shunt pathways, or that a much lower pH is required to affect Na^+ cellular transport, and that Na^+ and volume absorption changes driven by reduced pH may play a role in the diarrhea seen in clinical states of reduced pH in the colonic lumen.

8633 ABSORPTION OF PANCREATIC LIPASE FROM THE DUODENUM INTO LYMPHATICS. (Eng.) Papp, M.; Feher, S.; Folly, G.; Horvath, E. J. (Hungarian Acad. Sciences, P.O. Box 67, H-1450 Budapest, Hungary). *Experientia* 33(9):1191-1192; 1977.

To study the absorption of pancreatic enzymes, lipase activity was determined in the duodenal lymph and in the blood plasma of the femoral artery of dogs prior to and during maximal hormonal stimulation of exocrine pancreatic function. Duodenal lymph was collected in anesthetized dogs first for 90 min during saline infusion and then for 120 min during and after stimulation of exocrine pancreatic secretion by the i.v. infusion of 4 U/kg secretin and pancreozymin. Arterial blood samples were collected before, at 20, 40, and 60 min during stimulation, and at 90 and 120 min after stimulation. The mean basal pancreatic lipase activity was significantly higher in the duodenal lymph than in arterial blood plasma (p<0.01). When hormonally stimulated pancreatic juice was secreted into the duodenum, lipase activity was significantly elevated both in the duodenal lymph (p<0.01) and in each of the plasma samples (p<0.01) as compared with the initial values. Under these conditions, the mean pancreatic lipase activity in the duodenal lymph samples was significantly higher (p<0.01) than in the plasma samples. These results are thought to reflect pancreatic lipase absorption by the duodenum into lymphatics.

8634 DIPEPTIDE TRANSPORT IN THE INTESTINAL MUCOSA OF DEVELOPING RABBITS. (Eng.) Rubino, A.; Guandalini, S. (Second Sch. Medicine, Naples, Italy). *Ciba Found. Symp.* 50(New Series): 61-77; 1977.

The transport and selective carrier mechanisms of two dipeptides, glycyl-L-proline (G-pr) and glycyl-L-phenylalanine (G-ph), across the small intestinal brush border were studied in fetal, newborn, and suckling rabbits. G-pr is transported intact across the brush border, while G-ph is hydrolyzed at the border and the amino acids then transported across the brush border. Using glycine-labeled G-pr and phenylalanine-labeled G-ph, the intestinal uptake of each substrate was calculated from the amount of radioactivity in the tissue at the end of a 60-sec incubation period and compared with the uptake of the corresponding free acid. No significant differences in the uptake of free glycine in either ileum or jejunum were observed, but G-pr uptake showed a striking perinatal peak with a gradual increase from the 25th day of gestation, remained constant during the first 6 postnatal days, and then declined to reach adult values at 50 days after birth. G-pr transport proceeded by a single-carrier mechanism whose rate was stimulated by sodium ions. This transport did not appear to differ fundamentally from the influx process in adult rabbits, except that the maximal velocity was much larger in newborns than in adults (11.2 ± 2.5 and 0.81 ± 0.25 μmol/cm^2/hr, resp.). Affinity constants for G-pr uptake were 0.95 ± 0.26 and 0.91 ± 0.35 mM, resp., for newborns and adults. The two components of G-ph uptake were measured separately using a 40-fold excess of either G-pr or leucine as selective inhibitors of the intact peptide transport route and of the free acid transport after hydrolysis route, resp. Again, differences were noted between the uptake of free and dipeptide-bound phenylalanine. It was postulated that in fetuses the hydrolytic enzyme might not have developed and that it might develop completely only after birth. In newborn rabbits, the uptake of free amino acids was larger in the ileum, while the uptake of dipeptides was larger in the jejunum. Additional evidence of the distinction between the dipeptide and neutral amino acid transport processes was obtained in neonate rabbits; differences in the absorption of dipeptides and free amino acids along the length of the small bowel and a larger maximal velocity of the dipeptide carrier mechanism were observed in newborn rabbits. The findings may have significance in determining elemental diets for premature and full-term infants.

8635 EFFECTS OF INTRADUODENAL ACID ON GALLBLADDER NET WATER ABSORPTION AND MOTILITY IN THE CAT. (Eng.) Jansson, R. (Sahlgrenska sjukhuset, S-413 45 Goteborg, Sweden). *Scand. J. Gastroenterol.* 13(2):209-215; 1978.

Gallbladder absorption and motility were studied in anesthetized cats during the stimulation of gastrointestinal hormone release by intraduodenal acid infusion. Gallbladder function was studied with a perfusion technique that allows absorption and motility to be monitored simultaneously. The gallbladder is perfused at a constant rate from neck to fundus, and net water absorption is registered as a continuous decrease in weight on an electromagnetic balance. Hepatic bile flow is registered with a drop recorder. When the gallbladder was perfused by hepatic bile, the average net water absorption in the gallbladder was reduced from 0.60 ml/hr during the control period to 0.18 ml/hr ($p<0.01$) during HCl infusion (0.8 mmol/kg/hr). When the gallbladder was perfused by saline, intraduodenal acid infusion reduced net water transport from 1.34 ml/hr to 0.60 ml/hr ($p<0.01$). Acid infusion evoked a contraction of the gallbladder which, when estimated, expelled one-fifth of its contents. Bile flow increased from 1.37 ± 0.12 to 2.14 ± 0.16 ml/hr during acid instillation, and pancreatic secretion increased from 0 to 3.86 ± 0.77 ml/hr. The duodenal instillation of isotonic bicarbonate solution caused no changes in gallbladder net water transport, motility, or in bile or pancreatic secretion. A comparison of the present results with a study on the effects of i.v. secretin on gallbladder function suggests that the reduction in gallbladder net water absorption in response to intraduodenal acid can be explained by endogenously released secretin; the amount of secretin release evoked by acid infusion in this study can be assumed to be less than 2 U/kg/hr, since this amount reduced and even abolished absorption in the previous study. Gallbladder contraction observed after acid infusion may be explained by an endogenous release of cholecystokinin.

8636 ENHANCED NON-ELECTROLYTE UPTAKE IN VITRO BY THE DOG JEJUNAL MUCOSA IN THE CHOLERA-TOXIN-INDUCED SECRETORY PHASE. (Eng.) Robinson, J. W. L.; Mirkovitch, V.; Sepulveda, F. V.; Menge, H. (Centre Hospitalier Universitaire Vaudois, 1011 Lausanne, Switzerland). *J. Physiol. (Paris)* 73(1): 5-12; 1977.

8637 GLUCOSE AND CATION TRANSPORT IN RAT JEJUNUM, ILEUM AND COLON IN VIVO: EFFECTS OF ANIONIC AND NONIONIC SURFACTANTS, AND OF DESOXYCHOLATE. (Eng.) Sund, R. B.; Matheson, I. (Inst. Pharmacy, Univ. Oslo, P.O. Box 1068, Blindern, Oslo 3, Norway). *Acta Pharmacol. Toxicol.* 42(5):253-258; 1978.

8638 GENERALITY IN EFFECTS OF TRANSMUCOSAL FLUID MOVEMENT AND GLUCOSE ON DRUG ABSORPTION FROM THE RAT SMALL INTESTINE. (Eng.) Kitazawa, S.; Ito, H.; Johno, I.; Takahashi, T.; Takenaka, H. (Kyoto Univ. Hosp., Kawara-cho, Shogoin, Sakyo-ku, Kyoto 606, Japan). *Chem. Pharm. Bull.* 26(3):915-924; 1978.

8639 ROLE OF INTESTINAL MUCUS IN THE ABSORPTION OF QUININE AND WATER-SOLUBLE DYES FROM THE RAT SMALL INTESTINE. (Eng.) Nakamura, J.; Shima, K.; Kimura, T.; Muranishi, S.; Sezaki, H. (Faculty Pharmaceutical Sciences, Kyoto Univ., Yoshida Shimoadachi-cho, Sakyo-ku, Kyoto, Japan). *Chem. Pharm. Bull.* 26(3):857-863; 1978.

8640 EFFECTS OF FREE FATTY ACIDS AS MEMBRANE COMPONENTS ON PERMEABILITY OF DRUGS ACROSS BILAYER LIPID MEMBRANES: A MECHANISM FOR INTESTINAL ABSORPTION OF ACIDIC DRUGS. (Eng.) Hori, R.; Kagimoto, Y.; Kamiya, K.; Inui, K. I. (Hiroshima Univ. Sch. Medicine, Kasumi 1-2-3, Hiroshima 734, Japan). *Biochim. Biophys. Acta* 509(3):510-518; 1978.

8641 EFFECT OF LOW CALCIUM AND LOW PHOSPHORUS DIETS ON THE INTESTINAL ABSORPTION OF PHOSPHATE IN INTACT AND PARATHYROIDECTOMIZED PIGS. (Eng.) Fox, J.; Care, A. D. (Dept. Animal Physiology and Nutrition, Univ. Leeds, Leeds LS2 9JT, England). *J. Endocrinol.* 77(2):225-231; 1978.

8642 THE EFFECT OF INORGANIC PHOSPHATE ON INTESTINAL ABSORPTION AND URINARY EXCRE-

TION OF CALCIUM IN MAN. (Eng.) Falch, J. A.; Berstad, A.; Jorgensen, H. (Aker Hosp., Oslo, Norway). *J. Oslo City Hosp.* 27(9):105-110; 1977.

8643 MOVEMENT OF WATER AND SODIUM DURING THE ABSORPTION OF GLUCOSE AND MALTOSE IN THE JEJUNUM IN MAN [Abstract]. (Eng.) Holmes, R.; Lobley, R. W.; Sandle, G. I. (Royal Infirmary, Manchester, England). *J. Physiol. (Lond.)* 276:53P-54P; 1978.

8644 THE ABSORPTIVE VIABILITY OF ISOLATED INTESTINE PREPARED FROM DEAD ANIMALS. (Eng.) Gardner, M. L. G. (Univ. Edinburgh Medical Sch., Teviot Place, Edinburgh EH8 9AG, England). *Q. J. Exp. Physiol.* 63(1):93-95; 1978.

8645 MUCOSAL TRANSFERRIN AND FERRITIN FACTORS IN THE REGULATION OF IRON ABSORPTION. (Eng.) El-Shobaki, F. A.; Rummel, W. (Nutrition Dept., Natl. Res. Center, Dokki, Cairo, Egypt). *Res. Exp. Med.* 171(3):243-253; 1977.

8646 POSSIBLE ROLE OF INTESTINAL ALKALINE PHOSPHATASE ACTIVITY IN THIAMINE TRANSPORT. (Eng.) Matsuda, T.; Baba, A.; Iwata, H. (Dept. Pharmacology, Osaka Univ., 133-1, Yamada-kami, Suita-shi, Osaka, Japan). *Experientia* 34(1):18-20; 1978.

8647 SALIVARY GLAND K^+ TRANSPORT: IN VIVO STUDIES WITH K^+-SPECIFIC MICROELECTRODES. (Eng.) Poulsen, J. H.; Bledsoe, S. W. (Univ. California Sch. Medicine, San Francisco, CA 94143). *Am. J. Physiol.* 234(1):E79-E83; 1978.

See also, 8758.

MOTILITY

8648 VAGAL INFLUENCE ON DUODENAL MOTOR ACTIVITY. (Eng.) Mir, S. S.; Mason, G. R.; Ormsbee, H. S., III (Univ. Maryland Sch. Medicine, Baltimore, MD). *Am. J. Surg.* 135(1):97-101; 1978.

The extrinsic and intrinsic vagal influences on duodenal motor activity were studied in the anesthetized dog to determine whether electrical vagal stimulation influences duodenal motility specifically via extrinsic fibers to the duodenum or through an intrinsic innervation that crosses the gastroduodenal junction. Dogs were vagotomized, and stimulating electrodes were placed on the distal cut ends of the vagal trunks. After truncal vagal stimulation at 32 Hz, 5 msec, and 3 mamp, the gastric antrum and the duodenum at 3 cm and 8 cm demonstrated significant increases in contractile activity ($p<0.001$ and $p<0.01$, resp.). Upon termination of the stimulatory current, poststimulatory contractions, or off responses, were frequently noted on the antrum and the duodenum. Significant poststimulatory activity was observed on the antrum in all phases of the experiment. After truncal vagotomy followed by extrinsic denervation of the duodenum (DENER), vagal stimulation produced an increase in motility index at the antrum ($p<0.001$) and at both sites in the duodenum ($p<0.01$). Off responses were still demonstrable early in the poststimulatory period in both organs. After truncal vagotomy, followed by DENER and then by pyloric transection (PT), vagal stimulation continued to produce an increased motility index at the antrum ($p<0.01$), but no increase in motor activity was seen in the duodenum. Off responses no longer appeared at either duodenal position upon termination of the stimulus current. After truncal vagotomy and PT, stimulus-induced contractions on the antrum and duodenum were still present. However, when truncal vagotomy was followed by PT and then by DENER, only the antrum responded with increased motor activity. These results support the concept that the motor innervation to the duodenum is composed of extrinsic vagal fibers and intrinsic vagal nerves that appear to first enter the antrum and then cross the gastroduodenal junction to innervate the duodenum.

8649 POTENTIATION BY DIPYRIDAMOLE OF THE INHIBITION OF GUINEA-PIG ILEUM TWITCH RESPONSE CAUSED BY ADENINE DERIVATIVES. (Eng.) Moritoki, H.; Kanbe, T.; Maruoka, M.; Ohara, M.; Ishida, Y. (Faculty Pharmaceutical Sciences, Univ. Tokushima, Shomachi-1, Tokushima 770, Japan). *J. Pharmacol. Exp. Ther.* 204(2):343-350; 1978.

The inhibitory actions of adenine derivatives on transmural-stimulated ileal contractions were studied in the guinea pig, and the potentiation of the effects of these derivatives by dipyridamole was investigated. Adenosine and adenine nucleotides caused dose-dependent inhibition of ileal contraction induced by transmural stimulation (twitch response) at 0.1 Hz. The inhibitory effects of the adenine derivatives were potentiated by pretreatment with dipyridamole at concentrations of over 10^{-8} M for 30 min. Dipyridamole shifted the dose-response curve for adenosine to the left with concentrations of 3 x 10^{-8} and 3 x 10^{-7} M dipyridamole causing about 8- and 13-fold shifts, resp. Tritium activity, which was accumulated during incubation of the ileal segments with ^{3}H-adenosine, was reduced by dipyridamole; 10^{-7} M dipyridamole reduced the ratio of tissue activity to activity in the medium (T/M ratio) from 8.09 ± 0.94 to 4.13 ± 0.59, while 10^{-6} and 10^{-5} M dipyridamole decreased the T/M ratio further to 1.79 ± 0.29 and 0.94 ± 0.12, resp. When a 10-ml sample of 10^{-4} M adenosine was incubated with 500 mg of ileal segment, about 50% of the adenosine in the medium disappeared in 5 min, with a slight concomitant recovery of the twitch response; 50% recovery occurred after 20 min. In the presence of 10^{-6} M dipyridamole, adenosine disappearance and recovery of the twitch response were much slower; 50% of the adenosine disappeared in 15 min, and 50% of the twitch response was restored in 60 min. It appears that dipyridamole potentiates the inhibitory actions of adenosine and adenine nucleotides on the ileal twitch response by inhibiting both the accumulation and the degradation of adenosine.

8650 ELECTRICAL ACTIVITY OF COLON OF THE NON-SEDATED DOG. (Fre.) Bueno, L.; Garcia-Villar, R.; Ruckebusch, Y. (Ecole national veterinaire, 23, chemin des Capelles, 31076 Toulouse Cedex, France). *C. R Acad. Sci. [D] (Paris)* 285 (16):1463-1466; 1977.

Electromyographic studies of the colon were performed on nonsedated dogs that were fasted or that had ingested a standard meal. Electrodes were implanted in 10 anesthetized adult dogs in the wall of the ileum 2 cm above the ileo-colonic junction and in the wall of the colon, 5, 10, and 15 cm below the junction. One week after the electrodes were placed surgically, a second was inserted rectally to the ileocolonic junction to introduce endoluminal electrodes for comparative recordings in the nonsedated state. Both the intraparietal and endoluminal electrodes recorded two rhythms of colonic slow waves, with frequencies of 5.1 ± 1.3 cycles/min and 18.1 ± 1.1 cycles/min, resp. The electrograms produced by the endoluminal electrodes differed in two respects from the intraparietal recordings: (1) the amplitude of the rapid rhythms was in the neighborhood of 0.2 mV compared to 0.1 mV measured by the intraparietal electrodes and (2) the slower rhythm was recorded less than 2% of the time and was apparently superimposed on the rapid rhythm. Brief salvoes (1.4 ± 0.3 sec) of the faster rhythms appeared to be preferentially recorded by the endoluminal electrodes. It is concluded that the faster rhythm of the colonic slow waves arises in the muscularis mucosae, which is isolated from the muscular fibers of the wall by the submucosa in the dog.

8651 RELAXATIONS MEDIATED BY ADRENERGIC AND NONADRENERGIC NERVES IN HUMAN ISOLATED TAENIA COLI. (Eng.) Stockley, H. L.; Bennett, A. (Charing Cross Hosp. Medical Sch., London, W6 8RF, England). *J. Pharm. Pharmacol.* 29(9):533-537; 197

To investigate relaxations mediated by adrenergic and nonadrenergic nerves in isolated human taenia coli, macroscopically normal specimens of human as cending, transverse, and sigmoid colon, obtained a operation for colonic carcinoma or Crohn's disease were studied. The strips of taenia responded to electrical stimulation at 4, 8, and 16 Hz with 0.3 0.5, and 1 msec pulses, but most were unaffected a 0.1 msec. The order of magnitude of maximal relax ations induced by adrenergic blocking drugs was norepinephrine (0.2-1 µg/ml)>nicotine (1-40 µg/ml)≈ATP (90-1,440 µg/ml)>electrical stimulation. Electrical stimulation in the presence of hyoscine (2 µg/ml) caused relaxation followed by a rapid "after-contraction." Adrenergic blockade by oxprenolol (0.6-6 µg/ml) or guanethidine (20-30 µg/ml) caused relaxations to ATP to increase in three and decrease in one of five experiments and to nicotine at 16 Hz to decrease greatly or be wholly prevented. Relaxations to the effects of the indirectly-acting sympathomimetics tyramine (0.8-4 mg/ml, 0.5-5 min contact) and nicotine (4 µg/ml) were studied to examine interactions between adrenergic and nonadrenergic inhibitory nerves. Tyramine caused contraction followed by relaxation after washout, or only a delayed relaxation; the contractions were unaffected by tetrodotoxin (TTX, 1 µg/ml), dihydroergotoxine (1 µg/ml), or oxprenol (5 µg/ml) and were enhanced by tranylcypromine (0. 800 µg/ml). Relaxations to nicotine increased wit contact time up to 4 min ($p<0.05$ for the differenc in response between each time period) and were reduced by TTX to 1%, 2%, 6%, and 10% of controls with 0.5, 1, 2, and 4 min, resp., of contact time. Nicotine-induced relaxations that persisted in the presence of TTX seemed mainly adrenergic since oxprenolol (3 and 15 µg/ml) reduced them to 21% and completely prevented them, resp. Thus, adrenergic relaxations during stimulation occur only with short electrical pulses at high frequencies or wit ganglion stimulants. The results with TTX and the sympathomimetics demonstrate that colonic adrenerg nerves are mainly preganglionic and possibly synap with nonadrenergic inhibitory nerves. When the latter undergo direct maximal stimulation, respons to adrenergic nerve excitation are masked.

8652 A CIRCUMFERENTIALLY-SENSITIVE MINIATURE PRESSURE SENSOR FOR STUDY OF HUMAN ESOPH GEAL MOTILITY. (Eng.) Kaye, M. D.; Showalter, J. P.; Rock, K. C.; Johnson, E. (Gastroenterology Uni Univ. Vermont, Burlington, VT). *Med. Res. Eng.* 12(5):10-15; 1978.

8653 GASTRIC TRANSMURAL POTENTIAL DIFFERENCE RATS FED A RETINOL-FREE DIET. (Eng.) S mer, H.; Kasper, H. (Medizinische Universitatsklin Luitpoldkrankenhaus, D-8700 Wurzburg, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):136-138; 1978.

654 SYNTHESIS AND BIOLOGICAL ACTIVITY OF
8-L-ALA-MOTILIN AND 8-D-ALA-MOTILIN.
Eng.) Shinagawa, S.; Fujino, M.; Yajima, H.;
egawa, T.; Okuma, Y. (Chemical Res. Lab., Takeda
hemical Industries, Ltd., Juso-honmachi, Yodogawa-
u, Osaka, 532, Japan). *Chem. Pharm. Bull.* 26(3):
80-884; 1978.

655 INTRALUMINAL PRESSURE PROFILES AND MUCOSAL
MOVEMENTS IN THE STOMACH AND DUODENUM.
Eng.) Keet, A. D.; Vermaak, J. C.; Mouton, J.
Dept. Radiology, Univ. Stellenbosch, Tygerberg 7505,
outh Africa). *Am. J. Gastroenterol.* 69(2):144-148;
978.

656 ANASTOMOSIS BY INVAGINATION: A TECHNIQUE
TO PRESERVE ANAL SPHINCTER FUNCTION.
Eng.) Johnson, W. C. (Boston Veterans Admin. Hosp.,
oston, MA 02130). *Dis. Colon Rectum* 21(3):188-195;
978.

8657 THE LOGICAL ANALYSIS OF THE ELECTROENTEROGRAM. (Eng.) Wingate, D. L.; Barnett, T. (London Hosp. Medical Coll., Turner St., London E1 2AD, England). *Am. J. Dig. Dis.* 23(6):553-558; 1978.

8658 TESTS OF GASTROINTESTINAL MOTILITY. (Eng.) Connell, A. M. (Univ. Cincinnati Medical Center, Cincinnati, OH). *Clin. Gastroenterol.* 7(2):317-328; 1978.

See also, 8627, 8635, 8664, 8805, 8905.

SECRETION AND METABOLISM

659 VARIATIONS IN PARASYMPATHETIC SECRETORY
AND STRUCTURAL RESPONSES RESULTING FROM
IFFERENCES IN THE PRE-STIMULATION STATE OF PAROTID
CINI IN RATS: SOME FACTORS AFFECTING WATERY
ACUOLATION. (Eng.) Garrett, J. R.; Thulin, A.;
idd, A. (King's Coll. Hosp. Dental Sch., Denmark
ill, London SE5 8RX, England). *Cell Tissue Res.*
88(2):235-250; 1978.

660 PROTEIN AND DNA LEVELS IN THE SUBMANDIBULAR
SALIVARY GLANDS OF ISOPROTERENOL STIMULATED
ICE. (Eng.) Feiglin, B.; Reade, P. C. (Dept.
ental Medicine and Surgery, Univ. Melbourne,
arkville, 3052, Victoria, Australia). *Aust. J. Exp.
iol. Med. Sci.* 56(Part 1):1-10; 1978.

661 GASTROINTESTINAL HORMONES. (Eng.)
McGuigan, J. E. (Univ. Florida Coll.
edicine, Gainesville, FL 32610). *Ann. Rev. Med.*
9:307-318; 1978.

8662 STUDIES ON KALLIKREIN IN THE DUCT SYSTEMS OF THE SALIVARY GLANDS OF THE CAT. (Eng.) Maranda, B.; Rodrigues, J. A. A.; Schachter, M.; Shnitka, T. K.; Weinberg, J. (Dept. Physiology, Univ. Alberta, Edmonton, Alberta T6G 2H7, Canada). *J. Physiol. (Lond.)* 276:321-328; 1978.

8663 EFFECTS OF A NEW SELECTIVE β_1-ADRENOCEPTOR AGONIST ON AMYLASE SECRETION FROM THE RAT PAROTID GLAND. (Eng.) Carlsoo, B.; Danielsson, A.; Henriksson, R. (Dept. Otolaryngology, Univ. Umea, Umea, S-901 87 Sweden). *Br. J. Pharmacol.* 62(3): 364-366; 1978.

See also, 8622, 8629, 8782.

SECRETION AND METABOLISM

Stomach

664 ACID SECRETION AND MOTILITY OF ISOLATED
MAMMALIAN GASTRIC MUCOSA AND ATTACHED
USCULARIS EXTERNA. (Eng.) Yates, J. C.; Schofield,
.; Roth, S. H. (Div. Medical Physiology, Univ.
algary, Calgary, Alberta T2N 1N4, Canada). *Am. J.
hysiol.* 234(3):E319-E325; 1978.

A procedure for setting up a preparation of mammalian gastric mucosa from kitten or ferret is described, and the responses of both preparations to cholinergic, histamine, and pentagastrin stimulation were studied. The mucosa is stripped of its outer muscle coats except for a 2-mm strip of circular muscle fibers running across the diameter of the preparation. The connections of this strip to the underlying mucosa are undisturbed. The preparation is immersed on the nutrient side in Krebs-Henseleit solution gassed with 95% O_2 and 5% CO_2 and on the secretory side in 5% dextrose, with both sides at 37 C. Acid secretion is determined by a pH stat method, and motility is recorded by a strain gauge attached to one end of the muscle strip. Secretory and motility responses are recorded for the three main parietal cell agonists, acetylcholine (ACh), pentagastrin, and histamine. Ferret membranes displayed a spontaneous rate of secretion of between 0.6 and 1.8 μEq H^+/cm^2 hr with a mode near 1 μEq/cm^2/hr, while the kitten membranes exhibited basal rates of acid secretion having a similar range of variation with a modal value near 0.7 μEq/cm^2/hr. The greatest secretory response to acetylcholine (ACh) stimulation in the ferret membranes was seen with a concentration of 10^{-4} M; a mean plateau of secretion of 4.4 μEq/cm^2/hr was established within 16 min. Smaller responses were seen with lower (10^{-5} M) and higher (10^{-3} M) ACh concentrations. Fundic smooth muscle response to ACh was rapid, and onset consisted of an abrupt large increase in the amplitude of spontaneous contractions, which declined shortly thereafter, and of a more sustained increase in basal tension. Although only a small increase in secretion was seen after an ACh dose as high as 10^{-3} M in the kitten fundic membranes, the kitten and ferret membranes were not greatly dissimilar in their sensitivity to cholinergic stimulation; however, the stable choline ester, urecholine, had to be used before the acid secretory response was fully manifested in the kitten preparation. The mean plateau acid secretory responses to 6.51 x 10^{-7} and 6.51 x 10^{-8} M pentagastrin in the ferret were 4.6 and 3.9 μEq/cm^2/hr, resp. The contractile response was similar to that produced by ACh. The kitten membrane was less sensitive to the hormone, both in terms of secretory and muscle responses. Acid secretion increased to 3 μEq/cm^2/hr after stimulation with 1.6 x 10^{-6} M histamine. The contractile response varied with the histamine dose. In the kitten, the secretory response to 1.6 x 10^{-6} M histamine was similar to that in the ferret; 1.6 x 10^{-5} M histamine produced a further increase, which was not seen in the ferret. Changes in contractile activity and basal tension were much more profound than those seen in the ferret. In both animals, the similarity between the motility responses produced by cholinergic stimulation and pentagastrin was notable.

8665 ULTRASTRUCTURAL CHANGES IN MOUSE PARIETAL CELLS AFTER HIGH H^+ SECRETION. (Eng.)

Ito, S.; Schofield, G. C. (Harvard Medical Sch., Boston, MA). *Acta Physiol. Scand.* (Special Suppl.): 25-34; 1978.

Further elucidation of parietal cell ultrastructural changes found during different secretory stages, particularly when acid secretion was stopped, were studied. Perfused stomachs of anesthetized mice were monitored for acid secretion and then fixed at known periods of secretory activity and examined ultrastructurally. The characteristic morphology of active and of nonsecreting parietal cells was confirmed and some intermediate stages were observed. In histamine- and carbachol-stimulated parietal cells, taken from mice secreting as much as 1 μEq/g body weight/15 min at the peak period of secretion, the tubulovesicular compartment was greatly or completely depleted, and there was a great increase in the number and length of microvilli, which tended to occlude the luminal space of the canaliculi. In contrast to previous observations, this study suggests that the lumen of the gastric gland and the intracellular canaliculi are separate compartments. Observations in cat parietal cells, which showed an intracellular canaliculus with an open lumen, a canaliculus containing a section of a gastric spirillum, and lysosomal bodies containing spirilla, supported the internalization of the intracellular canaliculi. In mouse parietal cells recovering from high secretory activity, the lumen of the canaliculus appeared distended. Although elements of the tubulovesicular system came into close approximation with the plasma membrane, there was no evidence that there was any direct continuity between these two membrane compartments. Numerous small multivesicular bodies as well as lysosomes were apparent. When the parietal cells were returning to an inactive state, the microvilli seemed to lose some of their rigidity and were often pleomorphic or bulbous in shape. In some of these microvilli, tubular membranes were invaginated into the microvillar core. Concentric membrane profiles were present in the cytoplasm of recovering parietal cells. Associated with these concentric profiles were flattened vesicles and coated vesicles, the latter of which were either joined to the plasma membrane or free in the cytoplasm. In some cells, the cytoplasm contained clear, rounded or elongated bodies surrounded by two layers of closely apposed membranes. It is suggested that these morphological features and other processes that may not be apparent by current tissue preparation techniques are involved in the movement of membrane to and from the tubulovesicular compartment and the plasma membrane.

8666 THE ROLE OF ASPIRIN IN GASTRIC ULCERATION: SOME FACTORS INVOLVED IN THE DEVELOPMENT OF GASTRIC MUCOSAL DAMAGE INDUCED BY ASPIRIN IN RATS EXPOSED TO VARIOUS STRESS CONDITIONS. (Eng.)

Rainsford, K. D. (Univ. Tasmania Medical Sch., G.P.O. Box 252C Hobart, Tasmania, Australia). *Am. J. Dig. Dis.* 23(6):521-530; 1978.

The development of gastric mucosal damage induced by aspirin was studied in hooded rats stressed by physical (cold) and disease (adjuvant-induced arthritis, acute pain, inflammation) conditions to establish whether these stress states increase the susceptibility of gastric mucosa to aspirin damage. To elucidate the mechanisms involved in the physical stress plus aspirin interaction, a variety of pharmacological agents was also studied. Gastric irritation was measured 2 hr after the p.o. administration of aspirin (100-250 mg/kg) in a single dose or once daily doses for up to 10 days. Physical stress increased the sensitivity of the gastric mucosa to aspirin damage (there were 2.7 ± 1.0 lesions found in male rats treated with as-rin alone and 24.8 ± 9.5 lesions found in such ts with aspirin plus cold-stress treatment 0.05). No similar increases were noted in sease-stressed animals. Pharmacological inhibitors/antagonists of stress-mediated stomach ulration including atropine methyl nitrate (5-10 /kg, p.o.), bilateral vagotomy, phentolamine mg/kg, i.p.), propranolol (5 mg/kg, i.p.), metypone (250 µg/kg, i.m. for 4 days), metiamide (3 /kg, i.p.), cimetidine (5-40 mg/kg, i.p. or 40 /kg, p.o.), prostaglandins (PG) E_1 (2 mg/kg, i.p.), E_2 (5 mg/kg, i.p.), and 15(R),15-methyl PGE_2 (50 µg/ , i.p.) were studied. Use of the anticholinergic ent, atropine methyl nitrate (ED_{50}, 5 mg/kg folwing 200 mg/kg aspirin to stressed rats), bilaral vagotomy, or combined treatment with α- and -adrenergic blockers were effective in reducing e gastric mucosal irritation induced by aspirin us cold stress. The antisecretory agents prented the effects of aspirin plus cold stress, ostaglandins allowing no lesion formation at l. Levels of corticosterone in the blood and e distribution and metabolism of ^{14}C-labeled spirin in stressed and nonstressed rats were asured; as no differences in mucosal uptake of C-aspirin were observed, accelerated uptake of e drug was eliminated as a factor in the develment of gastric ulceration. The results show major involvement of the parasympathetic-vagal, mpathetic, and histamine-producing systems, but ot the adrenocortical axis, in the development of astric mucosal damage induced by aspirin plus hysical stress.

667 THE EFFECT OF BETA-ADRENERGIC AND CHOLINERGIC BLOCKADE ON THE CIRCADIAN RHYTHM OF ASTRINS IN SERUM.

(Eng.) Christensen, K. C.; tadil, F.; Malmstrom, J.; Rehfeld, J. F. (Rigsospitalet, 2100 Copenhagen, Denmark). *Scand. J. astroenterol.* 13(3):263-272; 1978.

tudies were carried out in 15 healthy subjects to etermine whether different gastrin components in he serum show circadian rhythms, and if so, whether eta-adrenergic and cholinergic blockade affect the erum concentration of gastrins. The subjects were nvestigated during p.o. treatment with the betadrenergic blocking agent propranolol (20 mg), the nticholinergic drug glycopyrron (1 mg), both rugs, or neither drug. Gastrin concentrations ere measured with an antiserum that measures all our main gastrin components in serum, and with a astrin-17-specific antiserum. A circadian rhythm as observed with both antisera. The total serum mmunoreactivity increased from 39 ± 3 pg/ml at 800 hr to a peak of 77 ± 7 pg/ml at 2300 hr, folowed by a nadir of 38 ± 2 pg/ml at 0400 hr. The ircadian rhythm was maintained during administraion of both drugs, but the concentrations of comonent III (gastrin-17) were reduced by beta-adrenrgic blockade (from 733 ± 71 to 599 ± 28 pg/ml/ r, p=0.05), while treatment with glycopyrron inreased the concentrations of the other gastrin omponents (from 490 ± 63 to 647 ± 57 pg/ml/hr, =0.01). The inhibition of gastric acid secretion y anticholinergics is presumably due to an action on the parietal cells; according to this study, the inhibition is connected by an increased gastrin stimulus. Beta-adrenergic blockade, however, seems to reduce the gastrin stimulus and might be of therapeutic interest in duodenal ulcer disease.

8668 THE INFLUENCE OF ATROPINE ON INSULIN- AND 2-DEOXY-D-GLUCOSE (2-DG)-INDUCED GASTRIN RELEASE IN DOGS.

(Eng.) Ornsholt, J.; Brandsborg, O.; Brandsborg, M.; Lovgreen, N. A.; Amdrup, E. (Kommunehospitalet, DK-8000 Arhus C, Denmark). *J. Surg. Res.* 23(4):246-250; 1977.

To evaluate whether parietal cells and gastrin cells differ in sensitivity to atropine, the influence of this drug on insulin- and 2-deoxy-D-glucose (2-DG)-induced gastric acid secretion and gastrin release was studied in gastric fistula dogs. 2-DG (200 mg/kg, i.v.) caused a pronounced rise in acid secretion within the first 15 min after injection ($p<0.05$), as compared with the basal level. Insulin (0.25 U/kg, i.v.) produced a marked increase in acid secretion over the basal level, with a peak output in the 30- to 45-min period. Insulin also produced increases in the serum gastrin level, which were significantly elevated above the basal level from 30 to 90 min after injection ($p<0.05$). The mean gastrin concentration stimulated by 2-DG showed an immediate rise to a peak value 15 min after the injection ($p<0.01$). Then a marked decrease occurred, reaching basal concentration at 45 min. Atropine pretreatment (0.05 mg/kg, s.c.) caused an almost complete block of insulin-induced acid secretion during the first three 15-min periods, but a weak secretion was recorded about 60 min after the injection, followed by a gradual decrease to the basal level at 120 min. Atropine initially blocked 2-DG-stimulated acid output, but thereafter a constant increase in acid output was observed. The acid output between 105 and 135 min was significantly higher than the basal secretion ($p<0.05$). Atropine in doses of 0.05 to 0.2 mg/kg had no effect on 2-DG- or insulin-stimulated gastrin release. Gastrin release during hypoglycemia in the dog might be cholinergic but resistant to atropine doses that are sufficient to block acid secretion.

8669 THE INHIBITION OF GASTRIN PRODUCTION BY CALCITONIN IN THE AGED.

(Ita.) Passeri, M.; Palummeri, E.; Soncini, G.; Monica, C.; Ferretti, P. G.; Galvagni, R. (Cattedra di Gerontologia e Geriatria dell'Universita degli Studi di Parma, Parma, Italy). *G. Clin. Med.* 58(9/10):321-338; 1977.

The effect of calcitonin on gastrin production in the aged was studied. A group of volunteers (average age 72 ± 3 yr) with no apparent gastrointestinal disorders was given pig calcitonin or salmon calcitonin (24 mg/kg or 20 µg, resp., i.v.) prior to a high-protein (9.5 g/250 ml) meal. The same patients served as controls when they received only the high-protein meal in a test carried out 72 hr prior to the calcitonin experiment. Blood samples taken during both studies were analyzed for calcium, gastrin, and insulin levels. In the 16 patients treated with pig calcitonin, the gastrin response peaked at 15 min after the meal at 130% of its basal value, whereas it reached 190% of its basal value at this time when calcitonin was not given first. At 90 min after the meal, the calcium level was approximately 9.5 mg/100 ml in the controls but about 9.2 mg/100 ml in the treated group. The insulin level was approximately 12 μU/ml 30 min after the meal in the controls but about 8 μU/ml when in the treated group. For those treated with salmon calcitonin, the gastrin values reached 160% of base value in the controls but only about 110% of base value in the treated group 20 min after the meal. The calcium level 10 min after the meal was approximately 10.1 mg/100 ml in the controls and about 9.8 mg/100 ml in the treated group. The insulin level was about 19 μU/ml 20 min after the meal in the controls but about 7 μU/ml in the treated group. The authors state that the results were statistically significant between the control and treated group for both pig and salmon calcitonin 20 and 30 min after the meal. It is suggested these effects might be important in postprandial regulation of calcemia, in the nourishment of bone, and in senile osteoporosis.

8670 INHIBITION BY SOMATOSTATIN (GROWTH-HORMONE RELEASE-INHIBITING HORMONE, GH-RIH) OF GASTRIC ACID AND PEPSIN AND G-CELL RELEASE OF GASTRIN.

(Eng.) Barros D'Sa, A. A. J.; Bloom, S. R.; Baron, J. H. (Singleton Hosp., Swansea, Wales). *Gut* 19(4):315-320; 1978.

The effects of somatostatin (cyclic growth hormone release-inhibiting hormone, GH-RIH) on gastric acid, gastrin, and pepsin secretion in response to insulin hypoglycemia, a meat meal histamine, and pentagastrin were studied in dogs with gastric fistulae. During experiments in which secretion was stimulated with histamine and pentagastrin, somatostatin was infused in the second hour of a 3-hr infusion of submaximal doses of histamine acid phosphate (0.5 μg/kg/min) and pentagastrin (1 μg/kg/hr). In the insulin experiments, insulin (0.2 U/kg) was given as a single i.v. injection, and somatostatin (5 or 8 μg/kg/hr) was infused for 30 min before and at 90-120 min after the insulin injection. During meal-stimulated experiments, somatostatin was given i.v. in the first 2 hr of a 3-hr experiment. In insulin-stimulated secretion experiments, the mean gastrin increment was inhibited by 70% after the lower dose and by 86% after the higher dose of somatostatin, almost identical with the inhibition of insulin-stimulated acid output of 74% and 85%, resp., after these doses. After a meal, inhibition of acid output was greater with increasing doses of somatostatin. At the lowest somatostatin dose (0.5 μg/kg/hr), there was a rebound in secretion after the somatostatin infusion was stopped, with the acid output exceeding control levels. During the 2-hr infusion with 1 μg/kg/hr somatostatin, gastric acid secretion was totally inhibited in every dog, with some return of secretion after the infusion was terminated. Acid secretion was completely inhibited throughout the 3 hr with the other four doses (2, 4, 8, and 16 μg/kg/hr). Meal-stimulated gastrin inhibition was also dose-dependent. Pepsin outputs after somatostatin were inhibited less than were acid outputs. Histamine-stimulated acid secretion was inhibited by somatostatin, and pentagastrin-stimulated acid output decreased immediately and rapidly after somatostatin was infused. Acid and pepsin outputs stimulated by pentagastrin were reduced by 94% and 76%, resp., after somatostatin. Basal plasma gastrin levels were not affected by histamine or pentagastrin infusions. During somatostatin infusion, the basal plasma levels were depressed, with some recovery after somatostatin infusions were stopped. These studies show that somatostatin inhibits the release of acid, pepsin, and gastrin from parietal, chief, and G-cells in response to a meal; of acid and gastrin in response to insulin; and of acid and pepsin in response to pentagastrin and histamine.

8671 INHIBITION OF GASTRIC ACID SECRETION IN DOGS BY A NEW SYMPATHOMIMETIC DRUG.

(Eng.) Gottrup, F.; Ornsholt, J. (Dept. Anatomy, Univ. Arhus, 8000 Arhus C, Denmark). *Scand. J. Gastroenterol.* 13(3):337-343; 1978.

The inhibitory effect of a new β_2-agonist, salmefamol, on pentagastrin-induced acid secretion was studied in conscious gastric-fistula dogs. Maximal pentagastrin-induced acid secretion was significantly reduced at i.v. doses of 0.1, 0.2, 0.4, and 0.8 μg/kg/min salmefamol. The inhibition was 43 ± 8% for the lowest dose (0.05 μg/kg/min) and 89 ± 4% for the highest dose (0.8 μg/kg/min). Inhibition occurred within 15 and 30 min, and the effect was maximal after 45 min. A dose-related decrease in the titratable acidity and volume was demonstrated. The maximal decrease was 34 ± 3% ($p<0.05$) and 83 ± 5% ($p<0.05$), resp. Salmefamol caused an increase in the pulse rate of 34 ± 5% (at the lowest dose) to 96 ± 22% (at the highest dose). Propranolol (0.2 mg/kg, i.v.) prevented the inhibition of acid output as well as the increase in pulse rate. Practolol (0.4 and 1.0 mg/kg, i.v.) had no effect on the inhibition of acid secretion but prevented the increase in pulse rate. Dose-response experiments with 0.25-8.00 μg/kg/hr pentagastrin and salmefamol at 0.1 μg/kg/min showed a decrease in the calculated maximal response and an unchanged half maximal acid response. It is concluded that salmefamol strongly inhibits pentagastrin-induced acid output in the dog, and that the inhibition follows noncompetitive kinetics. The mechanism of gastric secretion probably involves a β_2-receptor.

8672 BACTERIAL FLORA AND NITRITE PRODUCTION IN THE STOMACH AFTER GASTROENTEROSTOMY. EXPERIMENTAL ASPECTS OF THE PATHOGENESIS OF CARCINOMA IN THE OPERATED STOMACH.

(Ger.) Schlag, P.; Wonka W.; Meyer, H.; Feyerabend, G.; Merkle, P. (Abteilun fur Allgemeine Chirurgie des Departments fur Chirurgie, Universitat Ulm, Steinhovelstr. 9, D-7900

Ulm, W. Germany). *Langenbecks Arch. Chir.* 344(2): 109-114; 1977.

The effect of gastroenterostomy without entero-anastomosis, of gastroenterostomy with Roux-en-Y anastomosis, and of gastrotomy on the nitrite-decomposing bacteria of the stomach was studied in specific pathogen-free male Wistar rats to investigate the increased gastric cancer risk following gastric surgery. Gastroenterostomy without enteroanastomosis caused a marked increase in the proportion of the nitrite-decomposing bacteria (*Escherichia coli, Lactobacillus acidophilus, Peptostreptococcus productus,* and *Eubacterium contortum*), and, accordingly, a sixfold increase in the nitrite concentration in the gastric juice 35 weeks after operation. No significant change was seen in the proportion of the nitrite-decomposing bacteria or in the nitrite level of the gastric juice of the rats that underwent gastroenterostomy with Roux-en-Y anastomosis compared with the gastrotomied (control) rats. Increased nitrite concentration in the gastric juice may lead to an enhanced production of carcinogenic nitrosamines.

8673 EFFECT OF BILE ON LYSOSOMAL STABILITY IN THE MUCOSA OF THE CANINE GASTRIC ANTRUM. (Eng.) Waldron-Edward, D.; Boutros, M. I. R.; Himal, H. S. (Dept. Experimental Surgery, McGill Univ., 740 McGregor, Montreal, Quebec H3A 1A4, Canada). *Gastroenterology* 73(5):980-984; 1977.

The activities of bound and free hydrolases and the response of the membranes to hypoosmotic (distilled water, 4 C, 240 min) and mechanical (tissue grinder) stress were studied in explanted canine antral mucosa to investigate the role of bile reflux in ulcerogenesis. Tissue and bile were obtained from the same mongrel dogs and the explanted mucosa was treated with bile or bile and then acid and fractionated to obtain the lysosome-rich pellet. The particulate enzymes, acid phosphatase (AcP), cathepsin D (CD), β-galactosidase (βGAL), α-galactosidase (α-GAL), β-*N*-galactosaminidase (β-*N*-GAL), β-*N*-glucosaminidase (β-*N*-GLU), and α-fucosidase (α-FUC), varied considerably in the stability of their binding to subcellular organelles when the tissue had been treated with acid (120 mEq HCl)-saline (40 mEq NaCl) for 60 min: α-FUC and β-*N*-GAL activities remained tightly bound after hypoosmotic shock or mechanical stress, whereas about three times as much β-GAL and β-*N*-GLU activities (percentage of initially bound activity) were released. When tissue was treated with bile for 60 min, very little enzyme activity was lost from membranes during subsequent treatments; however, hypoosmotic shock doubled the release of CD into the soluble fraction ($p<0.001$) compared with nontreated mucosa subjected only to acid-saline. Similarly, soluble protein increased by 75% ($p<0.001$). The pellets from tissue treated first with bile (30 min) and then acid-saline (15 or 30 min) were quite fragile to hypoosmotic shock, the fragility increasing with time of exposure to acid-saline; the percentage of previously bound activity lost was significant in every case after the 30-min acid-saline treatment ($p<0.01$ for β-*N*-GLU and $p<0.001$ for AcP, CD, β-GAL, α-GAL, β-*N*-GAL, and α-FUC). However, this tissue yielded pellets that were markedly resistant to mechanical stress and only AcP, β-*N*-GLU, β-*N*-GAL, and α-FUC activities were released in significant ($p<0.001$) amounts. The total free plus labilizable activity of most of the acid hydrolases of the mucin-cleared, nuclei-free homogenates from the insulted mucosa decreased slightly from control levels, with a marked increase in protein level and decrease in enzyme specific activity in this fraction. The increased levels of free enzyme appeared in the supernatant fraction, reaching a significant level ($p<0.01$ or 0.05) in the bile-then acid-treated samples. It is concluded that, while bile alone has little direct effect on the membrane binding or activation of most acid hydrolases, it facilitates the influx of H^+, thus releasing the acid hydrolases into an active acidic environment and exposing the entire mucosal cell structure to abnormal biodegradation or autolysis.

8674 16,16-DIMETHYL PROSTAGLANDIN E_2 IS NOT A BARRIER BREAKER. (Eng.) Bolton, J. P.; Cohen, M. M. (Univ. British Columbia Faculty Medicine, Vancouver, British Columbia, Canada). *Surg. Forum* 28:363-366; 1977.

8675 MUCOSAL EROSIONS AND DEPRESSED GASTRIC PROTEIN SYNTHESIS IN THE SEMISTARVED RAT. (Eng.) Hargrove, W. C.; Mullen, J. L.; Stein, T. P.; Oram-Smith, J. C.; Rosato, E. F. (Univ. Pennsylvania Sch. Medicine, Philadelphia, PA). *Surg. Forum* 28:366-368; 1977.

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8677 CENTRAL AND PERIPHERAL ADRENERGIC MECHANISMS REGULATING GASTRIC SECRETION IN THE RAT. (Eng.) Yamaguchi, I.; Hiroi, J.; Kumada, S. (Fujisawa Pharmaceutical Co. Ltd., 1-6, 2-Chome, Kashima, Yodogawa-ku, Osaka 532, Japan). *J. Pharmacol. Exp. Ther.* 203(1):125-131; 1977.

8678 EFFECTS OF VARIOUS TYPES OF VAGOTOMY ON GASTRIN RELEASE AND GASTRIC SECRETION IN DOGS. (Eng.) Shiratori, T.; Okabayashi, T.; Nishigori, M.; Sakuro, R.; Shimano, Y. (Nara Medical Univ., Kashihara 634, Japan). *Tohoku J. Exp. Med.* 122(3):209-222; 1977.

8679 THE TURNOVER OF MUCIN GLYCOPROTEIN IN THE STOMACH. (Eng.) Waldron-Edward, D. (McGill Univ., Donner Building, P.O. Box 6070, Station A, Montreal, Quebec, Canada). *Adv. Exp. Med. Biol.* 89:301-308; 1977.

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8681 EFFECT OF PENTAGASTRIN ON CHOLINE ACETYLTRANSFERASE AND ACETYLCHOLINESTERASE ACTIVITIES IN VARIOUS TISSUES OF THE DIGESTIVE TRACT OF RATS. (Eng.) Majumdar, A. P. N.; Nakhla, A. M. (Inst. Medical Biochemistry, Univ. Aarhus, DK-8000 Aarhus C, Denmark). *Biochem. Biophys. Res. Commun.* 81(4):1241-1247; 1978.

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8683 BIOLOGICAL PROPERTIES OF THE GASTRIC JUICE INHIBITORY SUBSTANCE PRODUCED BY Streptomyces bottropensis F4708. (Eng.) Mimura, T.; Muto, N.; Oda, Y.; Tanaka, N.; Aonuma, S. (Faculty Pharmaceutical Sciences, Osaka Univ., 133-1, Yamadakami, Suita-shi, Osaka 565, Japan). *Chem. Pharm. Bull.* 26(3):998-1002; 1978.

8684 CHANGES IN ELECTROENCEPHALOGRAMS OF RATS DURING THE DEVELOPMENT OF STRESS ULCER. (Eng.) Harada, M.; Ishii, T.; Yano, S. (Faculty Pharmaceutical Sciences, Univ. Chiba, Yayoi-cho, Chiba 280, Japan). *Chem. Pharm. Bull.* 26(3):746-751; 1978.

8685 ZINC CONCENTRATION IN THE PLASMA AND STOMACHS OF RATS WITH GASTRIC ULCERATION. (Eng.) Jaffarian, S.; Yazdani, C.; Djahanguiri, B. (Sch. Medicine, Univ. Tehran, Tehran, Iran). *Isr. J. Med. Sci.* 14(4):485-486; 1978.

8686 ACID SECRETION AND CYCLIC NUCLEOTIDE CONTENT OF THE GUINEA PIG ISOLATED STOMACH IN THE PRESENCE OF THE IONOPHORE A23187. (Eng.) Canfield, S. P.; Curwain, B. P.; Spencer, J. (St. Mary's Hosp. Medical Sch., London W2, England). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):155-157; 1978.

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8688 A CORRELATIVE STUDY OF THE ANTIULCER EFFECTS OF ZINC SULPHATE IN STRESSED RATS. (Eng.) Cho, C. H.; Ogle, C. W. (Faculty Medicine, Univ. Hong Kong, Hong Kong). *Eur. J. Pharmacol.* 48(1):97-105; 1978.

8689 EFFECTS OF DRUGS INTERFERING WITH CATECHOLAMINE METABOLISM ON STRESS-INDUCED GASTRIC ULCERS IN THE RAT. (Eng.) Hano, J.; Bugajski, J.; Danek, L. (Inst. Pharmacology, Polish Acad. Sciences, 31-344 Cracow, Poland). *Pol. J. Pharmacol. Pharm.* 29(6):629-638; 1977.

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8692 DO β ADRENERGIC AGENTS DIRECTLY STIMULATE GASTRIN SECRETION? (Eng.) Kondo, T.; Magee, D. F. (Creighton Univ. Sch. Medicine, 2500 California St., Omaha NB 68178). *Experientia* 34(5):607; 1978.

8693 EFFECTS OF PROSTAGLANDIN E_2 ON GASTRIC ACID SECRETORY FUNCTION AND ULCEROGENESIS INDUCED BY DIFFERENT METHODS (EXPERIMENTAL STUDY). (Eng.) Vasilenko, V. H.; Grebenev, A. L.; Kochina, E. N.; Grebeneva, L. S.; Poloschenkova, L. A.; Tsvetkova, L. I. (First Moscow Medical Sechenov Inst. Moscow, USSR). *Gastroenterol. Jpn.* 13(1):1-7; 1978.

8694 TRANSPORT PARAMETERS OF GASTRIC VESICLES. (Eng.) Rabon, E.; Chang, H. H.; Saccomani, G.; Sachs, G. (Lab. Membrane Biology, Univ. Alabama in Birmingham, University Station, Birmingham, AL 35294). *Acta Physiol. Scand.* (Special Suppl.):409-426; 1978.

8695 H^+ TRANSPORT IN GASTRIC MICROSOMES: TOWARDS A MOLECULAR MODEL FOR SECRETION. (Eng.) Michelangeli, F.; Proverbio, F. (Centro de Biofisica y Bioquimica, Instituto Venezolano de Investigaciones Cientificas, Caracas, Venezuela). *Acta Phsyiol. Scand.* (Special Suppl.):399-407; 1978.

8696 HISTAMINE AS THE FINAL COMMON MEDIATOR: THE VIEW FROM THE FENCE. (Eng.) Rangachari, P. K. (V. P. Chest Inst., Dehli Univ., Delhi India). *Acta Phsyiol. Scand.* (Special Suppl.):209-218; 1978.

8697 HEMODYNAMIC ASPECTS OF STRESS-INDUCED GASTRIC MUCOSAL LESIONS IN PIGLETS. (Eng.) Hottenrott, C.; Seufert, R.; Becker, H.; Junghanns, K. (Chirurgische Universitats-Klinik, 6900 Heidelberg, W. Germany). *Chir. Gastroenterol.* 11(3):303-306; 1977.

3698 HAEMOSTATIC EFFECT OF TRIGLYCYLVASOPRESSIN ON BLEEDING FROM GASTRIC MUCOSAL LESIONS N THE RAT. (Eng.) Wetterlin, S.; Ahlgren, I.; ronsen, K. F.; Mulder, J. F. (Malmo General Hosp., almo, Sweden). *Res. Exp. Med. (Berl.)* 172(2): 31-135; 1978.

See also, 8623, 8653, 8778, 8844, 8847, 8850, 8876, 8878, 8896, 8905, 8910, 8914, 8917, 8918, 8923, 9149.

SECRETION AND METABOLISM

Pancreas

3699 COMPARISON OF TWO METHODS FOR DETERMINING THE DOSE-EFFECT RELATIONSHIPS BETWEEN CHOLECYSTOKININ AND EXOCRINE PANCREATIC FUNCTION IN THE DOG. (Ger.) Singer, M. V.; Dermol, P.; Mendes de Oliveira, J. P.; Sarles, H. (Unite de Recherches de Pathologie Digestive, INSERM, U 31, 46, chemin de la Gaye, F-13009 Marseille, France). *Z. Gastroenterol.* 16(2):95-100; 1978.

Dose-response curves to cholecystokinin (CCK) for pancreatic flow rate, bicarbonate output, and protein output were determined by two different techniques in three conscious dogs with gastric and duodenal Thomas fistulas. With the continuous technique (CT), the CCK dose was doubled each 45 min (3, 6, 12, and 24 Crick-Harper-Raper U/kg/hr). With the single-dose technique (SDT), only one of the above doses of CCK was administered on each test day. CCK was administered together with secretin (1 U/kg/hr, i.v.). The dose-response curves for pancreatic flow and bicarbonate output did not differ with the two techniques. At low CCK doses (3, 6, or 12 U/kg/hr), there was no difference between the two methods concerning the protein output. At the highest CCK dose (24 U/kg/hr), the maximum protein output was reached using the SDT; this output was significantly higher than that obtained with the CT ($p<0.01$). Consequently, the SDT is the method of choice for the determination of the maximum protein output, while the CT is sufficient for the determination of dose-effect relationships between submaximal CCK doses and protein output.

8700 EFFECTS OF HYPERTONIC GLUCOSE AND AMINO ACID INFUSIONS ON PANCREATIC EXOCRINE FUNCTION. (Eng.) Saito, Y.; Tokutake, K.; Matsuno, S.; Noto, N.; Honda, T.; Sato, T. (Tohoku Univ. Sch. Medicine, Sendai 980, Japan). *Tohoku J. Exp. Med.* 124(2):99-115; 1978.

The inhibiting effects of an i.v. infusion of 20% glucose, 30% glucose, 12% amino acids, or 20% mannitol (200 ml/hr for 1 hr or more) on pancreatic exocrine function were studied in mongrel dogs with chronic gastric and pancreatic fistulae. The effects of glucagon injected i.v. at intervals of 50 min in increasing doses of 2, 8, 16, and 32 μg/kg were measured (glucagon loading test). Basal stimulation by secretin and pancreozymin (continuous i.v. infusion of 0.025 U/kg/min in conscious dogs and 0.05 U/kg/min in anesthetized dogs) was also measured and showed a plateau in the volume of secreted pancreatic juice at 50-60 min after the start of infusion. Satisfactory results were obtained only with conscious dogs except in the measurement of immunoreactive glucagon (IRG). Infusion with 20% glucose, 30% glucose, or 12% amino acids for 1 hr significantly decreased both volume of pancreatic juice ($p<0.001$, $p<0.01$, $p<0.001$, resp.) and amylase output ($p<0.01$ for all 3 solutions) compared with preloading levels. In addition, both 30% glucose and 12% amino acids were more potent inhibitors than was 20% glucose ($p<0.05$ for both solutions). No changes in bicarbonate concentration were noted. The infusion of 20% mannitol for 2 hr produced an initial drop in the volume of pancreatic juice and in amylase output compared with preloading levels (both decreases were maximal at 10 min, $p<0.02$ and $p<0.05$, resp.), but at 50 min, both levels reverted to initial levels despite continuing infusion. When the 12% amino acid infusion was continued for 2 hr, however, both levels remained suppressed throughout the infusion. These differences in pancreatic response to 20% mannitol and to solutions having osmotic pressures equal to or greater than 20% mannitol showed that osmotic pressure does not exert a significant influence on the inhibitory effects of the test solutions. The 20% and 30% glucose infusions elevated blood sugar levels to average values of 261 and 367 mg/100 ml, resp. Increases in the levels of immunoreactive insulin (IRI) were produced by both glucose infusions and by the 12% amino acid infusion (levels never exceeded 73 μl/ml). There was an increase in the level of IRG following the 12% amino acid infusion but no trend of increase following either glucose infusion. Infused glucagon produced transitory inhibition of pancreatic juice secretion and amylase excretion, with the reduced values tending to return to initial levels 30 min after each injection. The greatest inhibition of pancreatic exocrine secretion in these experiments was produced by the amino acid infusion; IRI and IRG levels rose markedly. The stimulated glucagon release contributed to the suppression of pancreatic secretion. The infusion rate used in these studies was several times greater than the rate used clinically for hyperalimentation in adults with acute pancreatitis, but the solution concentrations are those used routinely. The marked suppression of pancreatic secretion observed tends to support the hypothesis that hyperalimentation with hypertonic glucose and amino acids is of value in the treatment of acute pancreatitis.

8701 THE EFFECT OF PROLACTIN ON CANINE PANCREATIC SECRETION: IMPLICATIONS ON THE PATHOGENESIS OF THE PANCREATITIS OF PREGNANCY.

(Eng.) Rosenberg, V.; Dreiling, D. A. (Mt. Sinai Sch. Medicine, City Univ. New York, 100th St. and Fifth Ave., New York, NY 10029). *Am. J. Gastroenterol.* 67(4):354-361; 1977.

The effect of the acute administration of prolactin on canine pancreatic secretion was studied to investigate the possibility that the pancreatitis of pregnancy may have a hormonal etiology. Pancreatic secretion was studied in 10-min samplings for 1 hr after the continuous i.v. pump infusion of secretin (0.3 U/kg/min) plus cholecystokinin-pancreozymin (CCK-PZ, 0.05 U/kg/min). The study was continued for an additional 3 hr after bolus administration of 2 mg prolactin. The average hourly volume, bicarbonate, and protein outputs during infusion of secretin and CCK-PZ were 104.5 ml, 13.8 mEq, and 1,298 mg, resp. The average hourly concentrations of bicarbonate and protein during this time were 132 mEq/l and 12.4 mg/ml. The average values during the first hour after prolactin injection were 84.7 ml, 9.3 mEq, and 1,088 mg for volume, bicarbonate, and protein output, resp., and 109 mEq/l and 12.8 mg/ml for bicarbonate and protein concentration, resp. During the second hour, these levels were 100.4 ml, 10.1 mEq, 799 mg, 101 mEq/l, and 7.9 mg/ml, resp. At hour 3, the levels were 101.6 ml, 9.7 mEq, 790 mg, 95 mEq/l, and 7.7 mg/ml, resp. These results show that prolactin diminishes the pancreatic response to continuous secretin plus CCK-PZ infusion. Protein enzyme concentration was unaltered, so that protein output was maintained. These alterations produce a low-flow enzyme-concentrated juice that would afford the possibility of small duct blockade by protein plug, thus explaining the pancreatitis of pregnancy.

8702 EFFECT OF SOMATOSTATIN ON BASAL AND STIMULATED PANCREATIC SECRETION IN THE RAT.

(Eng.) Folsch, U. R.; Lankisch, P. G.; Creutzfeldt, W. (Dept. Medicine, Univ. Gottingen, Gottingen, W. Germany). *Digestion* 17(3):194-203; 1978.

The response to somatostatin of basal and cholecystokinin (CCK)- and secretin-stimulated pancreatic secretion was studied in anesthetized male Wistar rats. The i.v. infusion or bolus injection of somatostatin was always preceded by at least 30 min of 0.15 M NaCl infusion. Dose schedules were (1) somatostatin, 100 μg/hr by infusion or a bolus injection of 50 μg/100 g, (2) 3 Ivy dog U (IU) CCK-PZ/100 g/hr alone or combined with 50 or 100 μg/100 g/hr somatostatin, and (3) 0.8 clinical U (CU) secretin/100 g/hr for 60 min followed by the same dose of secretin either alone or combined with 50, 100, or 200 μg/100 g/hr somatostatin. The basal secretion of amylase was markedly inhibited by the 100 μg/100 g/hr somatostatin dose; however, the bolus injection of 50 μg/100 g somatostatin produced a fourfold increase in amylase secretion for 10-20 min followed by a return to the basal level. No changes in volume of secretion were observed. The combination of 3 IU/100 g/hr of CCK with 100 μg/100 g/hr somatostat caused strong inhibition of amylase and trypsin secretion. The enzyme secretion increased immediately after termination of the somatostatin infusion, reflecting the short (3 min) half-life of CCK and demonstrating the reversibility of the inhibitory action of somatostatin. The CCK-stimulated volume output was markedly reduced by an infusion of 100 μg/100 g/hr somatostatin. The inhibition continued after the termination of the somatostatin infusion. No significant changes in the pattern or magnitude of secretin-stimulated pancreatic volume and bicarbonate secretion were observed. In these experiments, somatostatin did not influence secretin-stimulated bicarbonate concentration or rate of secretion but did influence the basal secretion of amylase. The CCK-stimulated enzyme and volume secretion were inhibited by somatostatin.

8703 SULPHATE METABOLISM IN THE EXOCRINE PANCREAS. II. THE PRODUCTION OF SULPHATED MACROMOLECULES BY THE MOUSE EXOCRINE PANCREAS.

(Eng.) Berg, N. B. (State Univ. New York, Upstate Medical Center, Syracuse, NY 13210). *J. Cell Sci.* 31:199-211; 1978.

The types of sulfated macromolecules, in particular, proteins, proteoglycans, and lipids, produced by the exocrine mouse pancreas were investigated in pancreatic tissue taken from male Swiss mice. The behavior of sulfated macromolecules (labeled with ^{35}S-sulfate) and secretory proteins (labeled with ^{3}H-leucine) was compared. In the presence of 5 x 10^{-4} M cycloheximide, a strong inhibitor of protein synthesis, tissue uptake of radioleucine was reduced about 95% of control valu during the first 30 min of incubation. A similar reduction in radiosulfate utilization was not evident until 4 hr of incubation, when an apparent intracellular pool of protein needed for the production of sulfated macromolecules was exhausted. Pilocarpine-induced secretion of macromolecules was studied by radioassay. In the presence of pilocarpine nitrate (5 x 10^{-7} M), both radioleucin and radiosulfate-labeled secretory material attain a level of 40% net secretion at 90 min postpulse. Material labeled with inorganic sulfate consistent appeared in the chase medium 10-15 min prior to the secretory proteins, reflecting a shorter intra cellular transport route taken by the sulfated material. In the next 90 min, the secretory proteins accumulated to nearly 70% net secretion whil sulfated material accumulation reached only 50% net secretion. These differences in secretion sho that leucine and inorganic sulfates are used for the production of different macromolecular species and indicate that the sulfated material is not secretory protein. The radioactivity of lipid and proteoglycan fractions prepared from pancreatic tissue 4 hr after i.p. injection of radiosulfate demonstrated that both sulfated proteoglycans and sulfolipids were produced in the pancreas. The experiments demonstrate that pancreatic acinar cells can utilize inorganic sulfate for the sulfination of proteoglycans and lipids but not of proteins.

8704 ACUTE HEMORRHAGIC PANCREATIC NECROSIS IN MICE: BILE ACIDS IN GALLBLADDER BILE, SERUM AND PANCREAS. (Eng.) Yousef, I. M.; Rao, K. N.; Lombardi, B.; Fisher, M. M. (Dept. Medicine, Univ. Toronto, Toronto, Ontario M5S 1A8, Canada). *Acta Hepatogastroenterol.* 25(1):55-61; 1978.

Because bile acids are implicated in the pathogenesis of acute hemorrhagic pancreatic necrosis with fat necrosis, the bile acid composition of the pancreas, serum, and gallbladder bile of mice was studied. Mice were fed (a) a choline-deficient ethionine-supplemented (CDE) diet (0.5% DL-ethionine), (b) a choline-supplemented diet (CS), (c) a choline-deficient (CD) diet, or (d) a normal control diet for 1, 2, or 3 days. In addition, bile acids were analyzed in the pancreas, gallbladder, and serum of animals with pancreatic necrosis. Moderate degrees of compression atrophy of the mucosa and wall of the gallbladder were present in 2 of 12 mice fed the CS diet, in 5 of 14 mice fed the CD diet, and in 8 of 16 fed the CDE diet; severe degrees of atrophy were present in 5 of 12 fed the CS diet, in 9 of 14 fed the CD diet, and in 8 of 16 fed the CDE diet. The concentration of total bile acids in gallbladder bile of mice fed the CDE diet was significantly lower than that in mice fed the other diets ($p<0.05$). The amount of total bile acids in the gallbladders of mice fed the experimental diets was two- to fourfold greater than that in the controls. The bile acid composition of the bile was similar in mice on the normal and choline-supplemented diets. Choline deficiency reduced the relative amount of cholic acid, while ethionine supplementation increased the relative amount of the dihydroxy unsaturated cholanic acid. Plasma bile acid composition was affected by the different diets in a manner similar to that in the bile. However, the total bile acid concentration in the plasma of mice fed the CDE diet was significantly lower than that in the plasma of mice fed the other diets ($p<0.05$). In the pancreas, cholic acid accounted for only about 25% of the bile acids extracted, and no muricholic acids were found. Total bile acid concentration and bile acid composition were not affected by any of the diets. However, the amount of total bile acids per pancreas was significantly greater in mice fed the CDE diet ($p<0.05$), due to a larger pancreas weight in these animals, than that in the mice fed the other diets. Bile acids apparently do not initiate or participate in the extensive cellular damage preceding and accompanying the onset of acute hemorrhagic pancreatic necrosis with fat necrosis in mice fed a CDE diet.

8705 SPECIES SPECIFICITY AND OTHER ASPECTS OF CHYMOTRYPSIN INHIBITION BY PLASMA. (Eng.) Wolgemuth, R. L.; Hanson, K. M. (Ohio State Univ. Coll. Medicine, 333 W. Tenth Ave., Columbus, OH 43210). *Digestion* 16(1/2):96-107; 1977.

8706 HUMAN PANCREATIC CATIONIC TRYPSIN AS A POSSIBLE MEDIATOR OF PANCREATIC SHOCK AS INFERRED FROM A STUDY OF ITS INTERACTION WITH SERUM AND α_2-MACROGLOBULIN. (Eng.) Aubry, M.; Travis, J.; Bieth, J. (U.E.R. des Sciences Pharmaceutiques, Universite Louis Pasteur, 67083 Strasbourg, France). *Biochem. Med.* 18(3):360-370; 1977.

8707 IMPAIRED ENTERIC DEGRADATION OF PANCREATIC ENDOPEPTIDASES IN ANTIBIOTIC-TREATED RATS. (Eng.) Genell, S.; Gustafsson, B. E. (Malmo General Hosp., S-214 01 Malmo, Sweden). *Scand. J. Gastroenterol.* 12(7):801-809; 1977.

8708 EXTRAPANCREATIC GLUCAGONS. (Eng.) Holst, J. J. (Bispebjerg Hosp., DK-2400 Copenhagen NV, Denmark). *Digestion* 17(2):168-190; 1978.

See also, 8633, 8774, 8795, 8798, 9053, 9072, 9073, 9225.

SECRETION AND METABOLISM

Hepatobiliary Tract

8709 MICROSOMAL DRUG METABOLISM IN ACUTE AND CHRONIC GALACTOSAMINE INCUCED HEPATIC INJURIES. (Eng.) Shigeta, Y. (Sch. Medicine, Keio Univ., Tokyo, 160 Japan). *Gastroenterol. Jpn.* 12(6):435-445; 1977.

Female Wistar rats were given D-galactosamine (GalN) acutely (400 mg/kg body weight, i.p.) or chronically (250 mg/kg body weight daily for 7 months, i.p.) to determine its effects on the biochemical components and drug-metabolizing activities of the microsomal membrane. Acute or chronic GalN administration produced significant ($p<0.01$) increases in liver weight compared with controls. Hepatic triglyceride concentration was significantly ($p<0.001$) increased by acute but unaffected by chronic GalN administration. The microsomal protein content was unchanged in the acute study but was significantly ($p<0.01$) decreased in the chronic study. Both studies demonstrated significant ($p<0.05$) increases in microsomal phospholipid content, expressed per mg of microsomal protein. Acute GalN administration produced a significant decrease in the cytochrome P450 content whether expressed per mg of microsomal protein ($p<0.001$) or per unit of body weight ($p<0.01$). Chronic GalN administration produced a significant increase in cytochrome P450 content when expressed per mg of microsomal protein ($p<0.01$) or per unit of body weight ($p<0.001$). Cytochrome b5 content was significantly increased in the acute study ($p<0.001$-0.05). NADPH cytochrome C reductase activity was unchanged in either study. The *N*-demethylating activity for aminopyrine was significantly decreased in the acute study when expressed per mg of microsomal protein ($p<0.02$) or per g of liver ($p<0.001$). In the chronic study, it was significantly increased when expressed per unit of body weight ($p<0.05$). Both studies demonstrated marked reductions in microsomal glucose-6-phosphatase activity. Electron microscopy of chronically damaged livers showed relatively well-preserved intracellular organelles of hepatocytes and an apparent proliferation of mitochondria. The smooth endoplasmic reticulum showed focally accentuated hypertrophy with liposomes in the dilated tubules. The data indicate that, in acute liver injury, hepatic microsomal drug-metabolizing activity is impaired. In chronic injury, the decreased drug-metabolizing capacity per unit of liver may be compensated by the enlarged hepatic mass, resulting in normal or even enhanced drug-metabolizing activity when expressed per unit of body weight.

8710 SIGNIFICANCE OF ENDOTOXAEMIA IN EXPERIMENTAL "GALACTOSAMINE-HEPATITIS" IN THE RAT.

(Eng.) Grun, M.; Liehr, H.; Rasenack, U. (Medizinische Universitatsklinik, Josef-Schneider-Str. 2, 8700 Wurzburg, W. Germany). *Acta Hepatogastroenterol.* 23(2):64-81; 1976.

Normal, colectomized, and endotoxin-resistant rats were studied after the induction of hepatitis by an i.p. injection of GalN (1.0 g/kg) to determine whether endotoxins contribute significantly to the pathogenesis of galactosamine (GalN)-induced hepatitis. Endotoxemia was detected by the limulus gelation test (LGT) within 9 hr after GalN administration in the normal rats. Weak endotoxemia was present in only 25% of the colectomized animals and in none of the rats resistant to exogenous and endogenous endotoxins. Phagocytic capacity decreased significantly ($p<0.0001$) by 72 hr following GalN administration in the normal rats but not in colectomized or endotoxin-resistant rats. The development of other clinical symptoms of GalN-induced hepatitis, including pyrogen reaction, disseminated intravascular coagulation, arterial hypotension, and hypoglycemia, correlated significantly with the development of endotoxemia. Hyperbilirubinemia was present after GalN treatment only in the animals that did not undergo colectomy or procedures that made them endotoxin-resistant. Transaminase elevation was lower or normal in colectomized or endotoxin-resistant animals than in animals that did not undergo pretreatment. The results indicate that endotoxins contribute significantly to the pathogenesis of GalN-induced hepatitis and to its clinical symptoms.

8711 PROTECTIVE ACTIVITY OF WHITE PHOSPHORUS ON HEPATIC TOXICITY IN THE RAT. (Fre.)

Quilichini, R.; Bildet, J.; Saurel, J.; Gendre, P. (Laboratoire de pharmacologie, Universite de Bordeaux II, 24 rue Paul Broca, 33000 Bordeaux, France). *Rev. Fr. Gastroenterol.* (138):25-36; 1978.

The ability of small doses of white phosphorus (WP) to prevent or reverse CCl_4-induced (1 g/kg, i.p.) liver toxicity was studied in male Wistar rats. Simultaneously, one-third of the rats received i.p. injections of a 10^{-14} dilution of 7 CH WP, one-third received injections of 10^{-30} 15 CH WP, and one-third received physiological serum (controls). The levels of SGOT, SGPT, and serum lactate dehydrogenase (LDH) were measured for 4 days after the injection. Histological studies on the livers of sacrificed animals were performed by electron microscopy 2, 12, and 48 hr after injection and by light microscopy 3, 8, and 15 days after injection. At 48 hr, the SGOT, SGPT, and LDH levels were consistently lower in rats given the 10^{-14} dilution of WP, compared with the animals treated with the 10^{-30} dilution of WP and the controls; the postinjection curves of the levels of SGOT, SGPT, and LDH were almost identical in the latter two groups over the 4-day period. Electron microscopy revealed fewer changes in the hepatocytes, such as degeneration and vacuolization, and light microscopy showed fewer areas of necrosis in rats treated with WP compared to controls; the lower dose of WP appeared histologically more efficacious. In a second study, rats were injected with two doses/day i.p. of either 10^{-14} or 10^{-30} dilutions of WP or with physiological serum for 15 days. These injections were discontinued 2 days prior to CCl_4 injection (1 g/kg, i.p.). The levels of SGOT, SGPT, and serum LDH, in particular, were lower in rats treated with either WP dilution compared with controls; the 10^{-14} dilution of WP was more efficacious than the 10^{-30} one in lowering liver enzyme levels after CT intoxication. Again, histological studies showed less evidence of necrosis in WP-treated rats. It is concluded that very weak dilutions of WP have a preventative and curative action with respect to the hepatic toxicity of CCl_4 in the rat.

8712 BILIARY SPASMOLYTIC ACTION OF 3-(2,4,5-TRIETHOXYBENZOYL) PROPIONIC ACID (AA-149) IN DOGS.

(Eng.) Satoh, H.; Maki, Y.; Kanno, M. (Medicinal Res. Lab., Central Res. Div., Takeda Chemical Industries, Ltd., Osaka 532, Japan). *Eur. J. Pharmacol.* 48(3):309-317; 1978.

A study of 3-(2,4,5-triethoxybenzoyl)propionic acid (AA-149) was undertaken to clarify its mode of action on the motor function of the biliary tract in anesthetized dogs relative to autonomic drugs, gastrointestinal hormone, morphine, and taurocholate. The resistance of the choledochoduodenal junction (CDJ), gallbladder pressure (GP), bile flow, biliary ductal pressure, and blood pressure were recorded simultaneously. Doses included i.v. injections of carbachol (0.5 µg/kg), morphine (5 µg/kg), atropine (0.1-1 mg/kg), isoproterenol (1 µg/kg), propranolol (2-10 mg/kg), cholecystokinin (CCK, 0.1-1 mg/kg), and taurocholate (10 mg/kg). AA-149 was administered intrajejunally or i.v. at doses of 2, 5, or 10 mg/kg. At all dose levels and by both means of administration, AA-149 produced a dose-dependent reduction in the resistance of the CDJ and in GP along with a dose-dependent increase in bile flow. Like CCK, AA-149 decreased biliary ductal pressure while increasing the bile flow in dogs with ligation of the cystic duct of the gallbladder. Taurocholate produced increases in both biliary ductal pressure and bile flow. The spasmic response of the CDJ to morphine was not consistently depressed by atropine, but it was depressed strongly by AA-149. The effects of AA-149 were not influenced by pretreatment with atropine, phentolamine, or propranolol. The findings suggest that AA-149 relaxes the biliary tract (relaxation of the sphincter of Oddi) and depresses morphine-induced spasm by a mechanism of action different from that of atropine. The relaxing effect of AA-149 on biliary smooth muscle is not mediated by cholinergic or adrenergic mechanisms. It is likely that AA-149 acts directly on biliary smooth muscle rather than acting indirectly through release of CCK. The authors conclude that AA-149 is a novel compound with choleretic activity and with a strong spasmolytic activity on the biliary tract and that it acts by a mechanism different from those of anticholinergic and sympathomimetic agents.

8713 THE INFLUENCE OF β-SITOSTEROL ON BILIARY CHOLESTEROL SATURATION AND BILE ACID KINETICS IN MAN. (Eng.) Begemann, F.; Bandomer, G.; Herget, H. J. (I. Medizinische Klinik der Universitat Hamburg, Martinistr. 52, D-2000 Hamburg 20, W. Germany). *Scand. J. Gastroenterol.* 13(1):57-63; 1978.

To further investigate β-sitosterol as a possible agent for the treatment of cholelithiasis, its effect on cholesterol saturation of human bile and on bile acid kinetics was studied in 10 patients without hepatic or intestinal disease, 6 of whom had mild to moderate hyperlipemia. The administration of β-sitosterol (12 g/day, p.o.) for 6-8 weeks resulted in a mean decrease of 11% in serum cholesterol level ($p<0.02$) and of 12% in biliary cholesterol saturation ($p<0.05$); the latter effect was due to a change in the relative amounts of biliary lipids (lower cholesterol levels and higher bile acid values), whereas phospholipids varied insignificantly. Individual long-term observations revealed a sustained reduction or a further decrease in the lithogenic index in three patients, while in a fourth, who presented originally with undersaturated bile, an initial slight decrease of the lithogenic index was no longer detectable after 20 months. Significant changes in bile acid kinetics were not detected. The results lend support for further investigations of sitosterol as a possible adjunct therapy in cholelithiasis.

8714 EFFECT OF SPIRONOLACTONE ON BILE FORMATION AND LIVER MICROSOMAL ENZYMIC ACTIVITIES IN THE RAT. (Fre.) Miguet, J. P.; Mavier, P.; Arondel, J.; Preaux, A. M.; Dhumeaux, D. (Hopital Henri-Mondor, F 94010 Creteil, France). *Gastroenterol. Clin. Biol.* 1(12):1007-1013; 1977.

To elucidate the mechanism of the diuretic spironolactone on drug metabolism, the effect on bile formation, liver microsomal oxidation, and conjugation of drugs was studied in rats. Male Sprague-Dawley rats were given 15 mg/100 g spironolactone p.o. for 4 days and then fasted for 1 day without water restriction. After catheterization of the bile duct, bile was collected every 10 min for 30 min. The 14 treated rats had a 40% increase in bile flow, compared with the 18 control rats, entirely due to an enhancement of the bile salt independent fraction. The flow of bile salts (expressed in nmol/min/100 g) did not differ significantly in treated and control rats. Ten control and 10 treated rats were killed after the bile flow studies and their livers were weighed and homogenized for study of the enzymes in the microsomal fraction. Livers of diuretic-treated rats were significantly ($p<0.02$) heavier than those of control rats. Ethylmorphine demethylase, aminopyrine demethylase, and aniline hydroxylase activities were 18, 25, and 37% greater in treated rats than in the control rats ($p<0.05$, $p<0.05$, and $p<0.02$, resp.). UDP-glucuronyltransferase activity toward phenolphthalein, *p*-nitrophenol, and bilirubin was increased 38, 45, and 170% by the diuretic treatment ($p<0.02$, $p<0.02$, and $p<0.002$, resp.). Cytochome P-450 activity was not significantly altered in spironolactone-treated rats compared to controls. It is concluded that the effects of spironolactone on bile flow and hepatic microsomes could account for attenuation of the pharmacological effect of various drugs.

8715 EFFECT OF Na$^+$ ON BILE ACID UPTAKE BY ISOLATED RAT HEPATOCYTES: EVIDENCE FOR A HETEROGENEOUS SYSTEM. (Eng.) Anwer, M. S.; Hegner, D. (Fachbereich Tiermedizin der Universitat Munchen, Munchen, W. Germany). *Hoppe Seylers Z. Physiol. Chem.* 359(2):181-192; 1978.

The effect of Na$^+$ on cholate (C) and taurocholate (TC) uptake by isolated rat hepatocytes was investigated, to further characterize the Na$^+$ dependency of hepatic bile acid uptake and to test the hypothesis that hepatic bile acid uptake occurs through a multicarrier transport system. Uptake rates of both C and TC were decreased significantly when Na$^+$ was replaced by K$^+$, Li$^+$, or choline, suggesting that part of the bile acid uptake is Na$^+$-dependent. The Na$^+$-independent uptake rate of C (50-60%) was about three times higher than that of TC. Since the specific cation used to replace Na$^+$ did not affect the Na$^+$-independent uptake rate significantly as the cation was varied, Na$^+$ was replaced by choline in all other experiments. Above 200 μM C or TC, the initial bile acid uptake rates increased linearly both in the presence and absence of Na$^+$. The slope of this "nonsaturable" component showed no Na$^+$ dependency, making it possible to calculate the Na$^+$-dependent uptake rate by subtracting the Na$^+$-independent uptake rate from the uptake rate in the presence of Na$^+$. Hyperbolic curves were obtained for Na$^+$-dependent uptake of both bile acids. Subtraction of the nonsaturable component from the Na$^+$-independent uptake rate also resulted in hyperbolic curves for both C and TC. These results indicate that both bile acids are transported into hepatocytes by (a) a nonsaturable uptake process, (b) a Na$^+$-independent saturable uptake process, and (c) a Na$^+$-dependent saturable uptake process. The inhibition of bile acid uptake by KCN (2 mM) and Oligomycin (20 μg/ml) was as follows: saturable Na$^+$-independent C uptake was inhibited by 60 ± 4% and 57 ± 5%, resp., saturable Na$^+$-dependent C uptake by 55 ± 4% and 30 ± 2%, resp., Na$^+$-independent TC uptake by 65 ± 6% and 44 ± 3%, resp., and Na$^+$-dependent TC uptake by 57 ± 4% and 29 ± 3%, resp. Uptake by the two saturable components was also inhibited 33-100% by other bile acids or analogues. These results suggest the operation of carrier-mediated, energy-requiring processes. The relationship between Na$^+$ concentration and the Na$^+$-dependent uptake rate was sigmoidal. The maximal uptake rate, rather than the K$_m$, was affected by Na$^+$, suggesting that more than one Na$^+$ act as cosubstrates in the transport of one bile acid molecule and that Na$^+$ exerts a stimulatory effect on the translocation of the bile acid-carrier complex across the membranes. Na$^+$-dependent uptake was inhibited by ouabain (0.1 or 1.0 mM), suggesting that this uptake process is linked to the activity of membrane-bound (Na$^+$-K$^+$) ATPase. Inhibition and competition studies suggested that C and TC share a common Na$^+$-independent transport system, while there are at least two Na$^+$-dependent transport systems for TC, one of which is shared by C.

8716 BILE ACID CONJUGATION IN ORGAN CULTURE OF HUMAN FETAL LIVER. (Eng.) Haber, L. R.; Vaupshas, V.; Vitullo, B. B.; Seemayer, T. A.; de Belle, R. C. (Montreal Children's Hosp., 2300 Tupper St. C-1220, Montreal, Quebec H3H 1P3, Canada). *Gastroenterology* 74(6):1214-1223; 1978.

An organ culture system for prolonged maintenance of human fetal liver was developed and used to investigate the formation of bile acid conjugates. Multiple liver specimens were obtained from human abortuses and stillbirths ranging from 10 to 29 weeks of gestation. Within 3 hr of hysterotomy, small fragments of liver were established in organ culture. The morphological integrity of the explants was demonstrated by light and electron microscopy. Functional viability was determined by adding radiolabeled primary bile acid to the medium and assaying the taurine and glycine conjugates formed. Primary bile acid was taken up by the tissues, conjugated with taurine and glycine, and secreted into the medium at a constant rate during 10 days *in vitro* and in constant increments during a selected 24-hr period. Human fetal liver survived intact for periods up to 10 days *in vitro*. Taurine conjugates of the primary bile acids were seen to predominate throughout gestation, and the mean glycine to taurine ratio was 0.32. Conjugates of cholic acid were synthesized in preference to those of chenodeoxycholic acid ($p<0.05$). The glycine to taurine ratio was significantly greater ($p<0.001$) when chenodeoxycholate was used as substrate compared with cholate in liver of the same gestational age. There was a tendency for the glycine to taurine ratio to increase with advancing gestational age ($p<0.01$). Supplementation of the medium with 3.75 x 10^{-4} M taurine resulted in enhanced taurocholate formation ($p<0.001$) with a concomitant decrease in glycocholate synthesis ($p<0.001$), suggesting competitive inhibition. This finding suggests that there is one acyl transferase system for both taurine and glycine. In medium supplemented with 2 x 10^{-6} M hydrocortisone, there was a reversal of the glycine-taurine ratio, which increased from a mean of 0.49 in the control group to a mean of 1.74 ($p<0.001$) in the experimental group.

8717 BILE ACID ESTER SULFATION IN THE HAMSTER AND MAN. (Eng.) Galeazzi, R.; Kok, E.; Javitt, N. B. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 71-73; 1977.

To determine the sites of bile acid synthesis, the proportion of ester sulfates in the plasma of hamsters that underwent bile duct ligation was compared with that in hamsters that underwent either bilateral renal pedicle or bilateral ureteral ligation. In addition, serum bile acids were analyzed in hepatitis B surface antigen (HBsAg)-positive patients. The proportions of serum cholate and chenodeoxycholate in the hamsters that underwent bile duct ligation were similar to those in the animals that underwent either renal pedicle or ureter ligation, indicating that considerable ester sulfation occurs in animals having no circulation to the kidneys. Total serum bile acids in the patients with HBsAg ranged from 18 to 37 μg/ml, and the proportions of chenodeoxycholate and cholate were approximately the same. In two patients with advanced renal disease, the proportion of sulfates in the serum was greater than that found in similar individuals with normal renal function. The results in hamsters indicate that there is considerable extrarenal sulfation of bile acids, probably in the liver. In man, the association of increased ester sulfates of bile acids in plasma in advanced renal disease may also imply an extrarenal source for their synthesis.

8718 CONJUGATION AND SULFATION OF LITHOCHOLIC ACID IN FETAL LIVER. (Eng.) Watkins, J. B.; Brown, E. R. *In: Bile Acid Metabolism in*

Health and Disease, Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976. (Baltimore: University Park Press): 65-70; 1977.

To determine whether the fetal liver is capable of sulfating lithocholic acid, thus rendering it less toxic and less readily reabsorbed by the intestine, in a manner similar to that found in the adult liver, bile acids were extracted from meconium from 15 newborn infants. In addition, experiments were carried out in a sheep model. Sulfated and nonsulfated bile acid conjugates were identified by gas-liquid chromatography and gas-liquid chromatography-mass spectroscopy. Of the bile acids isolated, 40-60% were found in the sulfate fractions. The majority of the secondary bile acids isolated were as sulfated derivatives, with nearly 60% of the sulfates being lithocholic acid principally as glycolithocholic acid sulfate, with the remainder being either glycodeoxycholic or glycoursodeoxycholic acid. Cholic and chenodeoxycholic acids were isolated predominantly in the nonsulfate fraction and principally as their taurine conjugates. Similar results were obtained in a fetal sheep model. Tracer doses of 24-^{14}C-24-lithocholate were administered i.v. to five chronic fetal sheep preparations, which were sacrificed 6-53 hr later. Maternal tissues contained 23 ± 4.6% of the recovered dose of ^{14}C-lithocholic acid injected into the fetus. The distribution of the label recovered in the mother was 78.5 ± 9.4% as taurolithocholate, 9.0 ± 3.6% as glycolithocholate, and 10.1 ± 5.2% as taurolithocholic acid sulfate. In the fetus, 91.4% of the lithocholate was conjugated with taurine and secreted into bile or intestine with a mean of 9.0% having been sulfated, the percentage of sulfation increasing with time. These experiments demonstrate that considerable quantities of sulfated lithocholic acid and other maternally derived secondary bile acids are found in the intestinal contents of the human infant at birth. The fetus may excrete and possibly detoxify maternally derived lithocholic acid either by excretion across the placenta or by the hepatic uptake, conjugation, sulfation, and then secretion into the fetal intestine. The high concentration of sulfated conjugates in meconium indicate that sulfation may represent a truly excretory process for the fetus and that these bile acids are not reabsorbed from the fetal intestine. Glycine-conjugated lithocholate may be sulfated more readily than the taurine-conjugated or the free bile acid.

8719 METABOLISM OF BILE ACIDS. V. METABOLISM OF URSODEOXYCHOLIC ACID IN RHESUS MONKEY. (Eng.) Ota, M.; Matsumoto, N.; Kuramoto, T.; Hoshita, T. (Hiroshima Univ. Sch. Medicine, Hiroshima, Japan). *Hiroshima J. Med. Sci.* 26(4):253-262; 1977.

The metabolism of p.o.-administered, radiolabeled ursodeoxycholic acid was studied in rhesus monkeys. After 24-[^{14}C]ursodeoxycholic acid administration (30 mg/kg), the maximum plasma level was observed at 30 min in two animals and at 8 hr in one monkey; the levels decreased biphasically in all animals thereafter. Most radioactivity was excreted in the feces, with transient elimination in the urine on the first day after administration. The biological half-life of ursodeoxycholic acid was approximately 2 days. Ursodeoxycholic acid in the liver was metabolized to tauroursodeoxycholate and glycoursodeoxycholate, which were excreted with the bile into the intestine. The taurine/glycine conjugate ratio in the bile varied with time after administration. The glycine conjugate predominated in the first 24 hr, and its proportion decreased thereafter; the proportion of the taurine conjugate excreted in bile increased in a complementary fashion. The conjugated bile acids were further hydrolyzed to free ursodeoxycholic acid, most of which was converted into lithocholic acid by intestinal microorganisms. Lithocholic acid was the major radioactive bile acid in the feces, but made up only a minor portion of biliary bile acids. Because of this, it seems likely that the lithocholic acid formed in the colon was poorly absorbed.

8720 SOME OBSERVATIONS ON THE MORPHOLOGICAL EVIDENCE FOR MECHANISM OF THE BILE SECRETION. (Eng.) Shin, Y. C. (Coll. Medicine, Korea Univ. 4, 2nd St., Myungyun-Dong, Chongno-Ku, Seoul, South Korea). *Acta Anat.* 100(4):499-511; 1978.

Bile secretion was studied ultrastructurally in the goldfish liver. The hepatocytes were seen to be closely packed between the sinusoids. Duct cells were embedded between the hepatocytes. The hepatocytes contained bile canaliculi. The lumina of these bile canaliculi were nearly obstructed with numerous microvilli. The mitochondria were similar in shape and distribution to those of mammalian hepatocytes. Lysosomes were usually present, and many of them consisted of homogenous material. These dense bodies showed acid phosphatase activity. The rough endoplasmic reticulum (RER) appeared as parallel arrays of flattened cisternae. The RER contained fibrillar material with occasional granules of low or moderate electron density. The smooth endoplasmic reticulum (SER) was especially prevalent in the vicinity of the Golgi apparatus. These smooth-surfaced tubules sometimes appeared to be in continuity with the RER. Smooth tubules in the vicinity of the Golgi apparatus were associated with linearly sacculated tubules. Isolated vacuoles containing cloudy material similar to that within the sacculated tubules and within the bile canaliculi were observed between the Golgi apparatus and the intracellular bile canaliculus and seemed to be derived from the linearly sacculated tubules associated with the Golgi apparatus. Some vacuoles were fused with the luminal cytolemmas of the bile canaliculus. It is concluded that these vacuoles participate in the transport of bile constituents. The duct cells showed no ultrastructural evidence to suggest that they are involved in bile secretion.

8721 EFFECT OF BILE SALTS ON THE BILIARY EXCRETION OF GLYCODIHYDROFUSIDATE IN THE

RAT. (Eng.) Montet, J. C.; Gerolami, A. (Unite de Recherches de Pathologie Digestive, INSERM, 46, Bd. de la Gaye, 13009 Marseille, France). *Can. J. Physiol. Pharmacol.* 56(2):163-167; 1978.

The biliary elimination of glycodihydrofusidate (GDHF), a structural analogue of bile salts, was studied in bile fistula rats to determine if GDHF and bile salts compete for biliary excretion or if bile salts increased GDHF transport as they do for BSP. GDHF was excreted in bile with a maximal excretory rate (T_m=0.80 μmol/min/kg) much lower than that of bile salts. When an i.v. bolus injection of 3 μmol of GDHF was followed after 2 min by a continuous dehydrocholate perfusion (10 μmol/min/kg), biliary excretion of GDHF was increased 24% in comparison with that in control rats. When the biliary T_m had been attained by continuous perfusion of GDHF at a rate of 1.35 μmol/min/kg, taurocholate or dehydrocholate infusion increased this T_m to a similar degree. The effects of dehydrocholate and taurocholate on GDHF biliary secretion suggest a stimulatory effect of bile salts on canalicular excretion of the drug. The results are similar to those previously obtained concerning the effects of bile salt infusions on the T_m of BSP and suggest that hepatic transport of GDHF and bile salts occurs by routes that are distinct for canalicular transport in spite of the striking structural similarities between GDHF and bile salts.

8722 BRAN AND BILE: TIME-COURSE OF CHANGES IN NORMAL YOUNG MEN GIVEN A STANDARD DOSE.

(Eng.) Wicks, A. C. B.; Yeates, J.; Heaton, K. W. (Bristol Royal Infirmary, Bristol, England). *Scand. J. Gastroenterol.* 13(3):289-292; 1978.

The biliary response to a standard dose of bran was evaluated in 12 healthy men, and the time-course of previously observed changes in bile acid levels and biliary cholesterol saturation produced by dietary bran was investigated. All subjects added 15 g of bran to their usual diet and underwent aspiration of bile rich duodenal contents at 0, 1, 2, 4, and 6 weeks. In the 6-week sample, but not earlier, there was a significant decrease in the amount of deoxycholate (from 22.7 ± 2.8% to 16.5 ± 1.8%, $p<0.02$) and an increase in that of chenodeoxycholate (from 30.1 ± 1.6% to 34.9 ± 2.2%, $p<0.02$). Bile was unsaturated with cholesterol at the beginning of the experiment and remained so throughout. The delay in the action of bran on deoxycholate may occur because it reduces the formation of deoxycholate in the colon and does not merely impede its absorption.

8723 BILIRUBIN METABOLISM: STATE OF THE ART.

(Eng.) Schmid, R. (Univ. California, San Francisco, HSW 1120, San Francisco, CA 94143). *Gastroenterology* 74(6):1307-1312; 1978.

Recent chemical and biochemical observations concerning bilirubin metabolism are reviewed. Aspects of bilirubin structure, with particular emphasis on the various pigment isomers and the importance of intramolecular hydrogen bonding are considered, and the hepatic conjugating mechanism and bilirubin conjugates are discussed. The conjugating mechanism of the liver cell seems to serve the sole purpose of altering the involuted hydrogen-bonded conformation of bilirubin IX by esterifying its two propionic acid groups with carbohydrate moieties. Only the bilirubin isomers that can form intramolecular hydrogen bonds, as in the natural bilirubin IX_{α}, require conjugation for excretion. Other isomers, including the artificial isomers IX_{β}, γ, and δ, and probably the photochemically-produced E isomers of bilirubin IX_{α}, can be excreted directly in bile.

8724 EFFECTS OF SATURATED AND UNSATURATED FATS GIVEN WITH AND WITHOUT DIETARY CHOLESTEROL ON HEPATIC CHOLESTEROL SYNTHESIS AND HEPATIC LIPID METABOLISM.

(Eng.) Bochenek, W.; Rodgers, J. B. (Albany Medical Coll., Albany, NY 12208). *Biochim. Biophys. Acta* 528(1):1-16; 1978.

The effects of both dietary cholesterol and of fatty acid composition of the diet on hepatic cholesterol synthesis were studied in rats. Cholesterol synthesis was evaluated by measuring 3-hydroxy-3-methylglutaryl-coenzyme A reductase (HMCoA) activity and by determining the rate of ^{3}H-labeled sterol production from ^{3}H-mevalonate. The results were correlated with sterol balance data and hepatic lipid content. The mean total hepatic lipid levels in rats fed a diet containing either saturated or unsaturated fat and no cholesterol were similar to those in controls fed a normal rat-chow diet. The total hepatic lipid levels in rats fed a high-cholesterol diet (1% of diet) were significantly higher ($p<0.001$) than the control level, and the highest levels (700 ± 153 mg total lipids) were found in the rats fed the high-cholesterol and unsaturated fat diet as opposed to the levels (453 ± 74 mg) in those fed the high-cholesterol and saturated-fat diet. The mean total hepatic cholesterol level in rats fed the low-cholesterol and saturated-fat diet was significantly lower than that in controls (23 ± 4.0 versus 28 ± 4.2 mg, $p<0.05$); the levels in rats fed the high-cholesterol and saturated-fat diet (50 ± 19 mg, $p<0.005$) and in rats fed the high-cholesterol and unsaturated-fat diet (124 ± 42 mg, $p<0.001$) were significantly higher than the control level. Fecal sterol outputs were similar in rats consuming either saturated or unsaturated fats. HMCoA activity was significantly higher in rats fed the low-cholesterol diet than in those fed the high-cholesterol diet both when the dietary fat was saturated (673 ± 358 versus 175 ± 91 pmol/mg protein/min, $p<0.001$) and when the dietary fat was unsaturated (446 ± 329 and 62 ± 14 pmol/mg/min, $p<0.002$). The levels of HMCoA activity were significantly lower in all animals fed the saturated-fat diet compared with controls ($p<0.05$), in those fed the high-cholesterol and unsaturated-fat diet compared with those fed the high-cholesterol and saturated-fat diet ($p<0.002$), and in those fed the unsaturated-fat diet compared with the controls ($p<0.005$ for high-cholesterol diet and $p<0.1$ for ow-cholesterol diet). ^{3}H-labeled sterol prouction from ^{3}H-mevalonate was significantly higher n rats fed the low-cholesterol diet than those fed he high-cholesterol diet both when the dietary fat as saturated ($p<0.05$) and when it was unsaturated $p<0.001$). Sterol synthetic activity was signifiantly lower in animals fed the saturated fat diets $p<0.005$ for low cholesterol, $p<0.001$ for high holesterol) and in those fed the unsaturated fat iets ($p<0.001$) than in the controls. Cholesterol onsumption decreased the percentages of essential olyunsaturated fatty acids. It is concluded that ietary cholesterol alters cholesterol and fatty cid metabolism in the liver and that this effect s enhanced by dietary unsaturated fats.

725 EFFECTS OF CHOLESTEROL FEEDING ON SYNTHESIS AND METABOLISM OF CHOLESTEROL AND ILE ACIDS IN GERMFREE RATS. (Eng.) Gustafsson, B. .; Angelin, B.; Einarsson, K.; Gustafsson, J. A. Karolinska Institutet, Stockholm, Sweden). *J. ipid Res.* 18(6):717-721; 1977.

he influence of cholesterol feeding on cholesterol ynthesis and fecal excretion of bile acids was tudied in germfree rats. Four germfree rats were ed a basal diet containing 0.004% cholesterol, nd four germfree rats received the same diet suplemented with 0.4% cholesterol for 2 weeks. Choesterol synthesis was studied by assaying the -hydroxy-3-methylglutaryl coenzyme A (HMG CoA) eductase activity in the liver microsomal fraction. holesterol feeding decreased the mean HMG CoA eductase activity from 28.5 ± 6.6 to 9.1 ± 0.7 mol/mg protein/min. In another experiment, four ermfree rats received the basal diet and four ermfree rats, the cholesterol-enriched diet. After weeks, feces were collected in two 4-day pools or analysis of bile acids. The main fecal bile cids were cholic acid and β-muricholic acid, comrising more than 95% of total bile acids. Cholic cid was increased from 3.9 ± 0.2 to 9.9 ± 1.2 g/kg/day and β-muricholic acid from 6.6 ± 0.5 to 1.8 ± 3.1 mg/kg/day. The percentage of cholic cid decreased from 37.1 ± 1.1 to 31.2 ± 1.0%. ermfree rats, like conventional rats, have the bility to compensate for an increased input of ietary cholesterol by inhibition of cholesterol ynthesis and stimulation of bile acid synthesis. he synthesis of chenodeoxycholic acid (inferred rom the fecal excretion of β-muricholic acid) s stimulated to a greater extent than that of holic acid.

726 IMPAIRMENT OF HEPATIC CHOLESTEROL SYNTHESIS FROM SQUALENE AND THE FUNCTION F HEPATIC STEROL CARRIER PROTEIN SYSTEM BY AGEING. Eng.) Takeuchi, N.; Koga, M.; Yamamura, Y.; anaka, F.; Yamaguchi, Y.; Uchida, K. (Osaka Univ. osp., Fukushima-ku, Osaka, Japan 553). *Exp. Gerntol.* 13(1/2):1-7; 1978.

holesterol synthesis from squalene was measured n adult and in developing male Sprague-Dawley ats, and the effects of cytosol fractions from different age-groups on cholesterol synthesis of the hepatic microsomes from respective groups were compared *in vitro*. Incorporations of squalene and mevalonate into cholesterol in hepatic microsomes and cytosol obtained from growing (4-week-old) or young (2-month-old) rats were higher than those in microsomes and cytosol from adult rats. When the microsomes from growing or young rats were combined with the cytosol from adult rats instead of with young cytosol, the incorporation rates of squalene and mevalonate into cholesterol were decreased. When adult microsomes were combined with young cytosol, cholesterol synthesis from mevalonate was increased, but that from squalene was not. Cytosol fractions from cholesterol-fed rats did not inhibit cholesterol synthesis from squalene in the microsomes from nontreated rats, and the normal cytosol did not influence cholesterol synthesis in the microsomes from cholesterol-fed rats, suggesting that the elevation of serum cholesterol in aged animals did not affect the activity of the cytosol fraction. It is concluded that the function of the hepatic sterol carrier protein is probably impaired by ageing process.

8727 THE EFFECT OF AGEING ON THE BILIARY EXCRETION OF OUABAIN IN THE RAT. (Eng.) Kitani, K.; Kanai, S.; Miura, R.; Morita, Y.; Kasahara, M. (Tokyo Metropolitan Inst. Gerontology, Itabashi-ku, Tokyo, Japan). *Exp. Gerontol.* 13(1/2): 9-17; 1978.

Studies were carried out to gain information regarding age-related changes in hepatic elimination and biliary excretion of ouabain in the rat. The plasma concentration and biliary excretion of ouabain were determined in 3-, 6-, 16-, 18-, and 24-month-old male Wistar rats that each received an i.v. injection of ^{3}H-ouabain (0.4 mg/100 g). The plasma ouabain concentration increased with age, an effect most clearly seen in plasma samples taken at 2 and 5 min after injection. In 3-month-old rats, the level was 9.3 ± 1.1 μg/ml at 2 min and 5.1 ± 1.9 μg/ml at 5 min; in 24-month-old rats, it was 19.9 ± 2.4 μg/ml and 9.1 ± 1.0 μg/ml, resp. The difference was greater between 3- and 6-month-old rats than between 6- and 24-month-old rats. As time elapsed after ouabain injection, the age difference in plasma concentration decreased. The biliary excretion rate of ouabain was highest in the first 10-min bile sample in 3-month-old rats, and the excretion rate decreased thereafter. In contrast, excretion in 6-month-old or older rats was lower in the first sample, and the peak excretion was observed in the second 10-min sample. In the first 10-min sample, the excretion rate of 24-month-old rats was less than one-third of that in 3-month-old rats. Spironolactone pretreatment (7.5 mg/100 g/day) for 4 days in 16-month-old rats accelerated biliary ouabain excretion by an average of approximately 30%, in comparison with that in controls. The cumulative excretion rate in these rats approached the level seen in 6-month-old rats. The results indicate that there are age-related differences in ouabain elimination. These differences may be due to changes in bile flow rate.

8728 IN VITRO AMINO ACID TRANSPORT INTO BRAIN REGIONS OF RATS WITH A PORTACAVAL ANASTOMOSIS.

(Ita.) Rigotti, P.; Pizzolato, G.; Zanchin, G.; Bonino, M.; Vassanelli, P.; Battistin, L. (Istituto di Patologia Speciale Chirurgica, Padova, Italy). *Acta Chir. Ital.* 33(3):486-492; 1977.

A preliminary study of the uptake of amino acids by slices of forebrain, cerebellum, mesodiencephalon, and pons medulla of rats is presented. Male Sprague-Dawley rats were subjected to portacaval shunts; 1 month later, when the rats had a hunchbacked appearance and lowered reactions to stimuli, they were decapitated, and their brains were divided into four parts. Slices made from each of the four parts were placed into oxygenated medium and incubated 1 hr with four ^{14}C-labeled amino acids, then homogenized and analyzed for radioactivity. A decreased uptake of all four amino acids was revealed when compared with uptake by brain slices from unoperated controls. Glutamic acid uptake in comparison with controls was -4% in forebrain, -9% in cerebellum, -15% in mesodiencephalon, and -7% in pons medulla. The results for gamma-aminobutyric acid were -16% in forebrain ($p<0.10$), -2% in cerebellum, -10% in mesodiencephalon, and -9% in pons medulla. Glycine uptake was -22% in forebrain ($p<0.01$), -5% in cerebellum, -8% in mesodiencephalon, and -2% in pons medulla. Valine uptake was -16% in forebrain ($p<0.02$), -15% in cerebellum, -21% in mesodiencephalon ($p<0.02$), and -25% in pons medulla ($p<0.001$). These observations suggest that cerebral transport is affected in these experimental animals by portacaval anastomosis. The possible role of transport mechanisms impaired by portasystemic encephalopathy deserves further study.

8729 SOME OBSERVATIONS ON THE LIVER AND LUNG-MICROSOMAL-HYDROXYLATING ENZYME-ACTIVITY IN PORTO-CAVAL SHUNTED RATS.

(Eng.) Vassanelli, P.; Richter, C. (Istituto di Patologia Chirurgica dell'Universita di Padova, Policlinico, via Giustiniani, 35100 Padova, Italy). *Acta Chir. Ital.* 33(4):608-612; 1977.

Since the lungs and liver have the same embryological origin from primitive gut and since the presence of some microsomal drug metabolizing enzyme activities in the lungs has been established, liver and lung drug metabolism was examined in rats with portacaval shunt. P-nitroanisol demethylase activity was significantly increased in the shunted rats (0.54 nmol/min/mg protein) compared with that in controls (0.29 nmol/min/mg), whereas no significant differences in cytochrome P-450 content and NADPH-cytochrome c reductase activity were noted after shunt. Benzo(α)pyrene hydroxylase activity in microsomes isolated from the lungs of rats with portacaval shunt was also increased. It appears that portacaval shunt may alter drug metabolism in rats, and that drug administration in patients with a portacaval shunt should be approached with caution.

8730 THE RABBIT AS AN EXPERIMENTAL ANIMAL FOR THE STUDY OF PORTASYSTEMIC ENCEPHALOPATHY (PRELIMINARY DATA).

(Ita.) Vassanelli, P.; Battaglia, G.; Merigliano, S.; Zannini, P. (Istituto di Patologia Chirurgica dell'Universita di Padova, Padova, Italy). *Acta Chir. Ital.* 33(3):478-485; 1977.

The use of rabbits to study portasystemic encephalopathy is advocated and discussed. Fifty rabbits were given end-to-side portacaval shunts, performed below the gastroduodenal vein to maintain the blood flow to the liver. They were maintained on diets differing in protein content (19, 7.6, or 14.9% of the dry material). Body weight and electroencephalograms were studied. The average weight of the 10 rabbits subjected to the shunt was 2.1 kg at the time of the operations and 1.6 kg 10 days after the operations. On day 10 after the operations, 10 operated rabbits and 10 that had been sham-operated were decapitated, and their brains were analyzed for gamma-aminobutyric acid (GABA) levels. Rabbits given a standard diet (19% protein) died within 10 days, and those given either diet of hay survived as long as 2 months. In all the rabbits surviving the operation, central nervous system disturbances (incoordination and difficulty in walking) were observed. The animals showed evidence of exaggerated amounts of fear, a tendency to bang their heads against their cages, and altered electroencephalograms. In all the operated rabbits, the GABA levels were raised an average of 273 γ% mg of brain compared with an average of about 98 γ% mg of brain in the controls. It is concluded that the rabbit makes an interesting experimental model for portasystemic encephalopathy because the size of the animal yields large tissue and blood samples, neuropathy is manifest in a short period of time after the operation (7-10 days), and increased levels of cerebral GABA are detectable following the operation.

8731 SYNERGISTIC ACTION OF HEPATOCYTE MEMBRANE DEFECT AND ACTIVATED COMPLEMENT SYSTEM IN LIVER CELL DEATH: AN EXPERIMENTAL APPROACH TO FULMINANT HEPATIC FAILURE.

(Eng.) Liehr, H.; Grun, M.; Seelig, H. P.; Seelig, R.; Rasenack, U. (Medizinische Universitatsklinik, Josef-Schneider Str. 2, D-8700 Wurzburg, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):105-110; 1978.

The hypothesis that massive liver cell necrosis is caused by activation of the complement system as a result of a hepatocyte membrane defect was tested in Chbb Thom strain rats. The animals received 50, 100, 200, or 1,000 mg/kg galactosamine i.p. with or without the simultaneous i.v. injection of 1.5 mg/kg endotoxin. Doses of 50 mg/kg or 100 mg/kg galactosamine produced no liver cell necrosis, whether or not endotoxin was administered simultaneously. The 200 mg/kg dose led to moderate liver cell necrosis, and when administered together with endotoxin, the animals developed fulminant hepatic necrosis. Animals that received 1 g/kg galactosamine together with endotoxin died approximately 12 hr later, whereas animals receiving 1 g/kg galactosamine alone were alive at 24 hr after administration. In the animals that received endotoxin and the high dose of galactosamine, immunohistological examination revealed that the third complement component was already fixed on the hepatocyte plasma membranes at 3 hr after administration and was accumulated within areas of necrotic parenchymal cells at 12 hr. It appears that liver cell death is complement-mediated if the hepatocyte membranes are altered.

8732 SURGICALLY INDUCED HEPATIC FAILURE IN ANIMALS.

(Eng.) Ouchi, K.; Nose, Y.; Hermann, R. E. (Cleveland Clinic, Cleveland, OH). *Cleve. Clin. Q.* 44(4):171-180; 1977.

Three types of surgically-induced hepatic failure (anhepatic, ischemic, and jaundiced) were induced in mongrel dogs (4 dogs/group) to examine the usefulness of each of these animal models of hepatic failure for understanding the underlying mechanisms of this entity and developing human therapeutic modalities. The animals in the anhepatic group survived 26, 17, 17, and 11 hr after the total hepatectomy, and the postoperative course was similar in all four. The clinical observations (vomiting of gastric contents and coffee-groundlike material; spastic motions; clonic convulsions; shallow and rapid breathing succeeded by deep and slow breathing; decline in systolic blood pressure, pulse rate, and respiratory rate; and oliguria succeeded by anuria) and the biochemical observations (severe acidosis and hypercapnea; respiratory alkalosis but decrease in arterial pH; decrease in all blood cell components; decrease in serum Na^+ and Cl^- levels; increase in serum K^+ level; gradual decreases in total protein, albumin, and fibrinogen levels; increases in all liver function tests; decline of cholesterol and blood urea nitrogen levels; increase in creatinine, uric acid, ammonia, and free fatty acid levels; slight decrease in the levels of branched-chain amino acids; moderate increase in phenylalanine and tyrosine; and marked increase in glutamic acid, glycine, and histidine levels) were extremely similar to those in humans with hepatic insufficiency. The animals in the ischemic group underwent occlusion of the common hepatic artery either at the same time, 48 hr after (2 animals), or 6 days after portacaval anastomosis; one of the two animals in the second group did not develop coma, so that ligation of the proper hepatic artery was also carried out (6 days after portacaval anastomosis). The onset time of coma and the survival time after the last procedure were directly related to the time interval between portacaval anastomosis and hepatic artery ligation; onset of coma occurred at 7, 12, 14, and 35 hr, resp., and survival time was 16, 18, 18, and 38 hr, resp., for these animals. The biochemical changes were very similar to those in the anhepatic model except for higher levels of the nonbranched-chain amino acids. Following operations to induce obstructive jaundice, the remaining four animals survived 5, 5, 7, and 17 weeks after surgery, resp. As is frequently observed in patients with obstructive jaundice, the causes of death (and therefore the clinical and biochemical observations) varied; the dogs died of severe liver abscess with renal failure, pneumonia, gastric hemorrhage from multiple erosions, and hepatic failure from biliary cirrhosis, resp. It is concluded that these animal models closely resemble hepatic insufficiency in humans.

8733 BILIVERDIN INITIATES THE LIVER REGENERATION IN THE RAT--A HYPOTHESIS.

(Eng.) Okazaki, K.; Nishimura, H.; Arizono, H.; Nishimura, N.; Suzuki, Y. (Aichi Medical Univ. Sch. Medicine, Nagakute, Aichi, Japan). *Biochem. Biophys. Res. Commun.* 81(2):512-520; 1978.

The hypothesis that biliverdin initiates liver regeneration was investigated in intact, sham-operated, and 90% hepatectomized female Wistar rats. Biliverdin was absent in the plasma of intact and sham-operated animals, while the levels in hepatectomized animals killed at 5, 10, 20, 30, 45, 60, 120, and 180 min after ligating the blood vessels and bile ducts serving the right lateral and caudate lobes were 3.2, 2, 1.3, 1.3, 2, 1.7, 0.7, and 0.7 µg/ml, resp. In another series of experiments, the values were 4.2, 0.7, 0.7, 1.3, 1, 1.7, 0.7, and 0.3 µg/ml, resp. The mitotic indices determined in 100,000 hepatic parenchymal cells from intact rats at 24, 80, and 32 hr after a single i.p. injection of biliverdin (10 mg/100 g) were 446 ± 118, 862 ± 68, and 224 ± 8, resp. Mitotic indices determined 30 hr after the i.p. injection of 0.1 mg/100 g biliverdin, bilirubin, or hemoglobin were 130 ± 47, 129 ± 2, and 26 ± 2, resp. After a 1 mg/100 g injection, the levels were 92 ± 5, 106 ± 1, and 87 ± 5, resp., while the levels after a 10 mg/100 g injection were 862 ± 68, 20 ± 8, and 681 ± 134, resp. The results support the hypothesis that biliverdin initiates liver regeneration in rats.

8734 CELLULAR ANALYSIS OF LIVER CELL NECROSIS INDUCED BY ACETAMINOPHEN [Abstract].

(Eng.) Shinozuka, H.; Lincoln, S.; Iammarino, R. M.; Vogt, M. T. (Sch. Medicine and Health Related Professions, Univ. Pittsburgh, PA 15261). *Fed. Proc.* 37(3):402; 1978.

8735 MECHANISM OF ETHANOL-DRUG INTERACTION IN RAT HEPATOCYTES [Abstract].

(Eng.) Chengelis, C. P.; Schulman, M. P. (Univ. Illinois Coll. Medicine, Chicago, IL 60612). *Fed. Proc.* 37(3):568; 1978.

8736 ACETALDEHYDE-INDUCED LIPID PEROXIDATION IN ISOLATED HEPATOCYTES [Abstract].

(Eng.) Stege, T. E.; Daniels, S. E.; Sturtz, J. (Ohio Wesleyan Univ., Delaware, OH 43015). *Fed. Proc.* 37(3):303; 1978.

8737 ACUTE EFFECTS OF ETHANOL ON MEMBRANES OF ENDOPLASMIC RETICULUM OF RAT LIVER [Abstract]. (Eng.) Murty, C. N.; Verney, E.; Sidransky, H. (George Washington Univ. Medical Center, Washington, DC 20037). *Fed. Proc.* 37(3):318; 1978.

8738 BIOCHEMICAL ALTERATIONS IN ORGANS OF MICE INFECTED WITH Hymenolepis microstoma, THE MOUSE BILE DUCT TAPEWORM. (Eng.) Pappas, P. W. (Coll. Biological Sciences, Ohio State Univ., Columbus, OH 43210). *J. Parasitol.* 64(2):265-272; 1978.

8739 EFFECT OF DIAMFENETIDE ON EXPERIMENTAL INFECTIONS OF Fasciola hepatica IN LAMBS: ANTHELMINTIC AND CLINICAL INVESTIGATIONS. (Eng.) Rew, R. S.; Colglazier, M. L.; Enzie, F. D. (Animal Parasitology Inst., U.S. Dept. Agriculture, Beltsville, MD 20705). *J. Parasitol.* 64(2):290-294; 1978.

8740 A METHOD FOR GALLBLADDER BILE COLLECTION WITHOUT THE NEED OF A THOMAS CANNULA. (Eng.) Soto, J. M.; Wallen, A. E.; Dreiling, D. A. (Mount Sinai Sch. Medicine, Fifth Ave. and 100 St., New York, NY 10029). *Mt. Sinai J. Med.* 45(1):116-117; 1978.

8741 REFLUX-FREE BILIARY TRACT RECONSTRUCTION USING A CANINE ILEOCOLONIC SEGMENT. (Eng.) Berlatzky, Y.; Lebensart, P.; Freund, H. (Hadassah Univ. Hosp., Jerusalem, Israel). *Surg. Gynecol. Obstet.* 146(5):768-772; 1978.

8742 THE EFFECT OF ALIPHATIC ALCOHOLS ON CERTAIN VITAMINS OF THE B-COMPLEX GROUP IN THE LIVER OF THE RAT. (Eng.) Shehata, M.; Saad, S. (Dept. Pharmacology, Univ. Cairo, Cairo, Egypt). *Pol. J. Pharmacol. Pharm.* 30(1):35-39; 1978.

8743 ACTIVE ENHANCEMENT OF CANINE LIVER ALLOGRAFTS WITH POLYSPECIFIC ANTIGEN. (Eng.) Lie, T. S.; Rao, G. S.; Ueda, T.; Kim, B. R.; Rommelsheim, K. (Medical Faculty, Univ. Bonn, Bonn, W. Germany). *Surg. Gynecol. Obstet.* 146(5):783-788; 1978.

8744 SIZE AND BLOOD FLOW OF THE LIVER ESTIMATED BY $^{99}\text{Tc}^{m}$ SCANNING. (Eng.) Pirttiaho, H. I.; Pitkanen, U. (Dept. Internal Medicine, Univ. Oulu, SF-90220 Oulu, Finland). *Acta Radiol. Ther. Phys. Biol.* 16(6):497-506; 1977.

8745 AN ELECTRON MICROSCOPIC STUDY OF EXPERIMENTAL CHRONIC VIRAL HEPATITIS IN NUDE MICE. (Eng.) Kakudo, K.; Sakurai, M.; Takahashi, S.; Kitamura, H. (Osaka Univ. Medical Sch., Osaka, Japan). *Med. J. Osaka Univ.* 28(1):57-66; 1977.

8746 EFFECT OF INTERRUPTION OF HEPATIC ARTERY ON LIVER REGENERATION. (Eng.) Ohtoshi, E.; Mizumoto, R.; Honjo, I. (Kyoto Univ. Medical Sch., Kyoto, Japan). *Arch. Jpn. Chir.* 46(6):681-688; 1977.

8747 STRAIN DIFFERENCE IN MOUSE CHOLELITHIASIS AND THE EFFECT OF TAURINE ON THE GALLSTONE FORMATION IN $C_{57}BL/C$ MICE. (Eng.) Fujihira, E.; Kaneta, S.; Ohshima, T. (Hokkaido Inst. Pharmaceutical Sciences, Katsuraokacho-62, Otaru, Japan). *Biochem. Med.* 19(2):211-217; 1978.

8748 LIVER CELL HETEROGENEITY: THE DISTRIBUTION OF FRUCTOSE-BISPHOSPHATASE IN FED AND FASTED RATS AND IN MAN. (Eng.) Schmidt, U.; Schmid, H.; Guber, W. G. (Medizinischen Poliklinik der Universitat Basel, Hebelstr. 1, CH-5046 Basel, Switzerland). *Hoppe Seylers Z. Physiol. Chem.* 359 (2):193-198; 1978.

8749 PERSISTENT INFECTION WITH MOUSE HEPATITIS VIRUS OF LOW VIRULENCE IN NUDE MICE. (Eng.) Tamura, T.; Taguchi, F.; Ueda, K.; Fujiwara, K. (Inst. Medical Science, Univ. Tokyo, 4-6-1, Shiroganedai, Minato-ku, Tokyo 108, Japan). *Microbiol. Immunol.* 21(12):683-691; 1977.

8750 EFFECT OF GLUCAGON AND INSULIN ON THE GROWTH OF NEONATAL RAT HEPATOCYTES IN PRIMARY TISSUE CULTURE. (Eng.) Armato, U.; Draghi, E.; Andreis, P. G. (Istituto di Anatomia Umana Normale, Via A. Gabelli 65, I-35100, Padova, Italy). *Endocrinology* 102(4):1155-1166; 1978.

8751 ALCOHOL AND HEPATIC DRUG METABOLISM. (Fre.) Pirotte, J. (Institut de Medecine, Universite de Liege, Liege, Belgium). *Acta Gastroenterol. Belg.* 40(7/8):278-283; 1977.

8752 COMPARATIVE STUDIES ON ORTHOTOPIC LIVER ALLOTRANSPLANTATION IN PIGS AFTER INTOXICATION WITH EXTRACTS FROM Amanita phalloides AND AFTER A LONG-TERM PRESERVATION OF TRANSPLANTS. (Eng.) Koristek, V.; Cerny, J.; Gregor, Z.; Hokl, J. (II. Chirurgische Universitatsklinik der J. E. Purkyne-Universitat, 656 02 Brno, Czechoslovakia). *Z. Exp. Chir.* 10(6):384-390; 1977.

8753 CHOLELITHIASIS IN A MALE RHESUS MONKEY (Macaca mulatta) FED A CHOLESTEROL-CONTAINING DIET. (Eng.) Geistfeld, B. L.; Bond, M. G.; St. Clair, R. W. (Bowman Gray Sch. Medicine, Wake Forest Univ., Winston-Salem, NC 27103). *J. Med. Primatol.* 6(4):237-244; 1977.

8754 EFFECTS OF DIBUTYRYL ADENOSINE 3',5'-MONOPHOSPHATE ON HEPATIC METABOLISM OF

FREE FATTY ACIDS. (Eng.) Klausner, H. J.; Soler-Argilaga, C.; Heimberg, M. (Univ. Missouri Sch. Medicine, Columbia, MO 65201). *Metabolism* 27(1): 13-25; 1978.

8755 EVIDENCE FOR ADDITIONAL MEDIATOR IN PROSTAGLANDIN-INDUCED CHOLERESIS. (Eng.) Ruwart, M. J.; Kaminski, D.; Jellinek, M. (Dept. Surgery, St. Louis Univ., St. Louis, MO 63104). *Prostaglandins* 14(5):975-982; 1977.

8756 EFFECT OF DIETARY WHEAT GLUTEN ON LIPID METABOLISM IN GROWING RATS. (Eng.) Mokady, S.; Einav, P. (Dept. Food Engineering and Biotechnology, Technion-Israel Inst. Technology, Haifa, Israel). *Nutr. Metab.* 22(3):181-189; 1978.

8757 EFFECT OF PANTOTHENIC ACID DEFICIENCY ON RAT HEPATOCYTES. (Eng.) Mahboob, S.; Estes, L. W. (Sch. Medicine, Univ. Pittsburgh, Pittsburgh, PA 15261). *Nutr. Metab.* 22(3):177-180; 1978.

See also, 8624, 8704, 8776, 8777, 9079, 9084, 9095, 9106, 9165, 9172, 9176, 9177, 9181, 9217, 9226.

SECRETION AND METABOLISM

Intestine

8758 A MODIFIED PROCEDURE FOR THE RAPID PREPARATION OF EFFICIENTLY TRANSPORTING VESICLES FROM SMALL INTESTINAL BRUSH BORDER MEMBRANES: THEIR USE IN INVESTIGATING SOME PROPERTIES OF D-GLUCOSE AND CHOLINE TRANSPORT SYSTEMS. (Eng.) Kessler, M.; Acuto, O.; Storelli, C.; Murer, H.; Muller, M.; Semenza, G. (Laboratorium fur Biochemie, Eidgenossische Technische Hochschule, Universitatsstr. 16 and 2, CH-8092 Zurich, Switzerland). *Biochim. Biophys. Acta* 506(1):136-154; 1978.

A simplification of a previously described procedure for the preparation of brush border membranes from small intestine is described. The procedure was tested for Na^+-dependent D-glucose transport, and it was also used to study choline transport across the brush border membrane. The procedure is simple, rapid, does not necessarily require scraping, and can be started from fresh or frozen material. It can be scaled up easily, allowing a quick production of large amounts of brush border membrane vesicles. $CaCl_2$ (10 mM) is added to mucosal homogenates and allowed to stand in the cold for 15 min. The suspension is centrifuged at 3,000 x *g* for 15 min, and the supernatant is then centrifuged at 27,000 x *g* for 30 min. The pellet is resuspended in the 40 ml of buffer needed for the experiment, homogenized, and centrifuged at 27,000 x *g* for 30 min. The transport ability of the "calcium vesicles" obtained by these methods was compared with that of "EDTA vesicles" reported previously. The calcium vesicles constantly produced a longer lasting and higher overshoot peak of D-glucose (3-8 times as high as the equilibrium value with 1 mM D-glucose and 100 mM NaSCN as the initial outer concentration). Even NaSCN or NaCl gradients as low as 10 to 0 mM produced detectable overshoots. The calcium vesicles allowed the unequivocal demonstration of the transient accumulation of L-alanine, which was impossible with EDTA vesicles. After 2-3 days at 4 C, calcium vesicles generally showed only a minor decrease in their transport ability, demonstrating their stability. These results indicate that the calcium vesicles are excellently suited for transport studies. Choline transport was found to occur by a saturable component with a K_m of 83 ± 4 μM (at 20 C) and by a nonsaturable component. It was independent of the presence of Na^+, since it was not affected when K^+ was substituted for Na^+, and appeared to be nonelectrogenic. The charge movement associated with choline transport into these vesicles must be compensated by the exit of another cation or the entry of an anion, through the same transport agency as choline.

8759 DOES HEPARIN OCCUR IN MUCOSAL MAST CELLS OF THE RAT SMALL INTESTINE? (Eng.) Tas, J.; Berndsen, R. G. (Histological Lab., Univ. Amsterdam, 1^e Const. Huygensstraat 20, Amsterdam, Netherlands). *J. Histochem. Cytochem.* 25(9):1058-1062; 1977.

The chemical nature of the glycosaminoglycan (GAG) moiety of rat mucosal mast cell granules was investigated using microspectrophotometric analyses combined with model experiments using polyacrylamide films containing different types of purified GAG or GAG and basic protein. For the microspectorphotometric recording of metachromatic curves from toluidine blue O (TBO)-stained mucosal mast cells, a staining pH of 1.0 was chosen to avoid interference by orthochromatic staining. The time course of the metachromatic peaks recorded from the TBO-stained mucosal mast cells after mounting in glycerol was plotted. An "equilibrium level," with a mean peak wavelength of 553 ± 4.5 nm and 553 ± 4.1 nm for duodenal and jejunal mast cells, resp., was reached after about 6 hr. However, within 36 hr all mast cells in the sections had faded completely. When the same technique was applied to peritoneal and mesenteric mast cells, a final mean peak wavelength of 514 ± 3.5 nm and 516 ± 5.2 nm, resp., was obtained. The equilibrium level was reached after about 5 days in both cases, and metachromatically stained mast cells were present for about 8 days. Model experiments using polyacrylamide films that contained various types of GAGs showed that the metachromatic peaks recorded after staining at pH 1.0 instead of the more usual pH level of 5.0 differed only slightly. To imitate the chemical composition of rat mast cell granules more closely, model films containing GAG and chymotrypsinogen A were stained under the same conditions. After staining at pH 5.0, the metachromatic peaks shifted again to higher wavelengths on addition of this basic protein to the GAG in the model films. This shift was further increased by staining these films at pH 1.0. In all cases, the peak changes were most pronounced in glycerol. The peak of the metachromatic complex of TBO with heparin, the highest sulfated GAG used, was found to be less sensitive to the effects just mentioned. The results indicate that significant amounts of heparin do not occur in these cells and that lower sulfated GAG(s) are present in the granules.

8760 ROLE OF THE SMALL INTESTINE IN LIPID METABOLISM. SMALL INTESTINAL METABOLISM OF PLASMA FATTY ACIDS. (Ger.) Gangl, A. (II. Univ.-Klinik fur Gastroenterologie und Hepatologie, Garnisongasse 13, A-1090 Vienna, Austria). *Fortschr. Med.* 96(13):713-717; 1978.

The metabolism of plasma free fatty acids in the small intestine was studied by the i.v. injection of ^{14}C-labeled palmitic acid in rats and in 12 human volunteers undergoing suction biopsy of the small intestine. Two minutes after the injection of palmitic acid into rats, 1% of the radioactivity was found in the small intestinal mucosa, 42% in water soluble oxidation products (CO_2, keto acids, and other metabolites), and only 16% in triglycerides. Experiments with simultaneous i.v. injection of ^{14}C-palmitic acid and intraduodenal injection of ^{3}H-palmitic acid showed that the fatty acid introduced into the intestine was mainly esterified to triglyceride, while that injected i.v. was mainly oxidized and incorporated into phospholipids. An intraduodenal infusion of glucose (2 g/kg/hr), cholestyramine (5% suspension), taurocholate (10 and 30 mmol), or cholecystokinin (1.5 Ivy U/kg, s.c.) had no noteworthy effects on the intestinal metabolism of plasma free fatty acids, while intraduodenally administered alcohol (0.33 g/kg/hr) inhibited the intestinal oxidation of fatty acid by 60% and doubled both the palmitic acid incorporation into triglycerides by the intestinal mucosa and the serum triglyceride concentration. Intraduodenally administered oleic acid and monooleate (82 mg in a molar ratio of 2:1, emulsified in 10 mM taurocholate) doubled the intestinal uptake of plasma free fatty acids, quadrupled their incorporation into intestinal triglycerides, and caused a sixfold increase in the secretion of plasma free fatty acids into intestinal lymph triglycerides. Similar findings were also obtained in the volunteers. The findings indicate the great significance of the small intestine in lipid and lipoprotein metabolism.

8761 SPECIFIC LOCALISATION OF NEUROTENSIN TO THE N CELL IN HUMAN INTESTINE BY RADIOIMMUNOASSAY AND IMMUNOCYTOCHEMISTRY. (Eng.) Polak, J. M.; Sullivan, S. N.; Bloom, S. R.; Buchan, A. M. J.; Facer, P.; Brown, M. R.; *et al.* (Royal Postgraduate Medical Sch., London W12, England). *Nature* 270(5633):183-184; 1977.

To investigate the distribution of neurotensin in the human gastrointestinal tract, samples of normal stomach, intestines, gallbladder, and pancreas were obtained at surgery and examined using radioimmunoassay and immunocytochemistry. Large amounts of neurotensin-like reactivity were found in the ileal mucosa. The number of cells staining solely with antibodies to neurotensin diminished as the jejunum was reached, and they were extremely sparse in the duodenum. Neurotensin immunoreactivity was not detected in the stomach, pancreas, or colon by immunocytochemistry, but small amounts were detected by radioimmunoassay in the stomach (0.27 ± 0.03 pmol/g wet weight) and colon (0.50 ± 0.19 pmol/g). The amounts of immunoreactivity in the duodenal, jejunal, and ileal mucosae were found to be 0.24 ± 0.10, 2.82, and 16.2 pmol/g, resp., by this technique. No reactivity was found in the pancreas or gallbladder. The immunoreactive cells were located in the upper two-thirds of the villi and were often seen to communicate with the intestinal lumen by means of microvilli. When serial 1-μm sections were stained with antibodies reacting with enteroglucagon (EG) and vasoactive intestinal peptide (VIP), the positive cells were completely distinct from those stained by the neurotensin antibodies. The VIP- and EG-positive cells contained considerably smaller granules than did the neurotensin cells. These studies indicate that neurotensin cells occur in high concentrations in the ileal mucosa, with lesser quantities in the jejunum, duodenum, stomach, and colon. The morphological features of these cells suggest that they are sensitive to changes in the gut lumen, which may provide the stimulus for the release of the peptide directly into the circulation.

8762 BREAKDOWN OF MUCIN AND PLANT POLYSACCHARIDES IN THE HUMAN COLON. (Eng.) Vercellotti, J. R.; Salyers, A. A.; Bullard, W. S.; Wilkins, T. D. (Anaerobe Lab., Virginia Polytechni Inst. and State Univ., Blacksburg, VA 24061). *Can. J. Biochem.* 55(11):1190-1196; 1977.

To obtain an estimate of the extent to which complex carbohydrates are degraded by bacteria in the human colon, aqueous extracts of colon contents from four human subjects were separated into high and low molecular weight fractions by chroma-

aphy on a Sephadex G-100 column. The composi-
of these fractions was compared with the com-
tion of similar fractions from ileal contents,
, from material entering the colon. There
two distinct peaks; a high molecular weight
(approximately 100,000 daltons) and a low
cular weight peak (approximately 1,000 daltons)
ll subjects. In all subjects, the concentra-
of high molecular weight carbohydrate in the
m was more than twice the concentration of high
cular weight carbohydrate in the colon, in-
ting that breakdown of complex carbohydrate
rs in the colon. The high molecular weight
ohydrate fraction contained sugars character-
c of plant polysaccarides (arabinose, xylose,
ose, rhamnose) as well as sugars character-
c of mucin (fucose, hexosamines, sialic acids).
entrations of most of these sugars were uni-
ly lower in the colon than in the ileum. Since
molecular weight protein concentrations were
r in the colon than in the ileum of two of the
subjects tested, some degradation of protein
also occur in the colon.

TURNOVER OF RAT BRUSH BORDER PROTEINS AFTER MASSIVE INTESTINAL RESECTION.

(Eng.)
mann, M.; Starita-Geribaldi, M.; Isman, H.;
ka, P. (Laboratoire de Biochimie, Universite
ice, Chemin de Vallombrose 06200, Nice, France).
hem. Biophys. Res. Commun. 81(2):493-497; 1978.

etermine if the turnover of brush border mem-
e proteins is affected by massive intestinal
ction, the relative degradation rates of brush
er proteins were compared in male Wistar rats
had undergone 75% proximal small bowel re-
ion with those in rats that underwent sham
ation. After small bowel resection, there was
gnificant decrease in the ^{3}H:^{14}C ratios for
molecular weight (>70,000 daltons) brush bor-
proteins when compared with proteins of similar
isolated from sham-operated animals ($p<0.05$).
e results indicate that brush border membrane
ein turnover is affected by 75% small intes-
l resection. The authors conclude that this
ge may reflect immaturity of the villus epi-
ial cells in the remaining ileum after resec-

IMMUNOCYTOCHEMICAL STUDY OF THE INTERACTION OF SOYBEAN TRYPSIN INHIBITOR WITH NTESTINAL MUCOSA.

(Eng.) Wilson, P. A.;
ed, R. N.; Hampe, M. M. V.; Holt, S. J. (Ian
es Ross Animal Res. Lab., P.O. Box 239,
ktown, New South Wales 2148, Australia). *Gut*
:260-266; 1978.

nvestigate further the cause of the pancreatic
rgement induced by orally ingested soybean
sin inhibitor (STI), antibodies raised against
nd purified by affinity chromatography were
to localize dietary STI in the rat gut by
escent immunocytochemical methods. This tech-
e permitted the clear intracellular demonstra-
of STI in the ileal mucosa of suckling rats; in adult rats no entry of STI into mucosal cells of the small intestine was demonstrated, being confined to the luminal surface of the mucosa. Although the passage of STI into and across the adult intestinal mucosa could not be excluded through the use of this technique, the results were consistent with a previously described intraluminal mode of action of STI, namely, that the pancreatic enlargement caused in sensitive species results from the inhibition of trypsin (which acts as the physiological inhibitor of the mucosal secretion of pancreotrophic hormones), thus resulting in the uninhibited secretion of these hormones.

8765 RELEASE OF VASOACTIVE INTESTINAL POLYPEPTIDE (VIP) BY INTRADUODENAL STIMULI.

(Eng.) Schaffalitzky de Muckadell, O. B.; Fahrenkrug, J.; Holst, J. J.; Lauritsen, K. B. (Bispebjerg Hosp., Bispebjerg Bakke 23, DK-2400 Copenhagen NV, Denmark). *Scand. J. Gastroenterol.* 12(7):793-799; 1977.

To determine whether stimuli other than i.v. calcium or electrical stimulation of the vagal nerves will elicit the release of vasoactive intestinal polypeptide (VIP) into the circulation, the effects of intraduodenal infusion of amino acids, glucose, fat, HCl, ethanol, and saline on plasma VIP concentrations were investigated in seven normal human subjects and 12 anesthetized pigs. In addition, the plasma VIP concentration after the ingestion of a mixed meal was determined in six normal subjects, and the effect of HCl on plasma VIP concentration was determined in five postvagotomy patients. In normal subjects, the median peripheral blood plasma VIP concentration in the basal state was 4.3 pM (range 0-12.0 pM). No significant changes in the VIP concentration occurred after amino acid infusion (40 ml of a mixture of alpha and beta casein), glucose infusion (0.3 M, 40 ml), NaCl infusion (0.15 M or 1.5 M, 40 ml), or ingestion of a meal. In contrast, HCl (0.1 M, 40 ml), isotonic fat emulsion (20%, 40 ml), and ethanol (60 ml Vodka) infusion increased the plasma VIP concentration in all seven normal subjects; the mean peak values after HCl, fat, or ethanol were 9.8 (range 5.9-12.6), 7.5 (2.4-10.2), and 12.6 (7.8-16.8) pM, resp. Truncal vagotomy did not change the response produced by HCl, and the VIP level increased from 5.8 pM (range 0-11.6 pM) to 10.2 pM (7.5-13.0 pM) after HCl infusion in the vagotomized patients. The results from VIP determinations in the portal plasma of pigs following amino acid, glucose, fat, HCl, ethanol, or saline infusion confirmed the findings in the peripheral blood plasma of the normal human subjects and showed that the VIP levels in portal plasma were 1.6-2.9 times higher than the VIP levels in arterial plasma. The pH threshold to VIP release was 1.1-2.1, and the effect of HCl was not abolished by ganglionic blockade with hexamethonium (10 mg/kg). These studies show that intraduodenal HCl, fat, and ethanol stimulate VIP release. The lack of VIP response to a meal (which contained fat) may be explained by the fact that changes in VIP concentration are greater in the portal plasma than in the peripheral circulation: VIP release might be detectable in the portal circulation only.

8766 EFFECT OF PENTAGASTRIN AND SECRETIN ON CELL RENEWAL AND THE THREE DIMENSIONAL STRUCTURE OF THE JEJUNAL MUCOSA OF THE FASTED RAT. (Fre.) Bosshard, A.; Pansu, D.; Lambert, R. (Hopital Edouard-Herriot, F 69374 Lyon Cedex 2, France). *Gastroenterol. Clin. Biol.* 2(2):165-176; 1978.

The effect of pentagastrin and secretin on the renewal of cells and the structure of the jejunal mucosa were studied in male Wistar rats fasted for 48 hr. In the second 24-hr period of fasting, the rats were injected i.p. with pentagastrin (175 μg/100 g) or secretin (24.5 clinical U/100 g) divided into seven doses given at 4-hr intervals. One group of hormone-treated animals was injected with tritiated thymidine (50 μCi/100 g) at the same time as the first injection of hormone and then killed either at the end of 48 or 72 hr. Animals from the second hormone-treated group were killed every 4 hr during the third 24-hr period, with tritiated thymidine injected 30 min before sacrifice. Control fasted rats had significantly ($p<0.05$) lower labeling and mitotic indices compared to nonfasted control rats; the wet weight of the intestines and the thickness of the intestinal wall were also decreased compared with nonfasted rats. In fasted rats injected with secretin, there was a decrease of the labeling index followed by a decrease of the mitotic index during the third 24-hr period compared with fasted control rats; also, the number of short villi in the intestinal mucosa increased. After the pentagastrin injections, labeling and mitotic indices increased until, at 72 hr, they were significantly ($p<0.05$) higher in treated rats than in fasted controls. Pentagastrin also induced thickening of the serosal villi and of the mucosal layer. The results confirm the trophic effect of gastrin on cell renewal and the three dimensional structure of the jejunum and the antitrophic effects of secretin on these parameters.

8767 EVALUATION OF THE EFFECTS OF CELLULOSE ON FECAL AND INTESTINAL CHARACTERISTICS OF MICE. (Eng.) Araujo, P. E. (Dept. Food Science & Human Nutrition, IFAS, Univ. Florida, Gainesville, FL 32611). *J. Food Sci.* 43(3):1040; 1978.

8768 FURTHER INVESTIGATIONS ON INDOMETHACIN AN INTESTINAL ULCERS IN THE RAT. (Eng.) Del Soldato, P.; Meli, A. (Menarini Pharmaceuticals, 50131 Florence, Italy). *Toxicology* 9(1/2):69-74; 1978.

8769 INHIBITION OF PROSTAGLANDIN BIOSYNTHESIS IN RAT SMALL INTESTINE BY SL-573. (Eng.) Yanagi, Y. (Pharmaceuticals Div., Sumitomo Chemical Co., Ltd., 4-2-1, Takatsukasa, Takarazuka, Hyogo, 665, Japan). *Biochem. Pharmacol.* 27(5):723-728; 1978.

8770 ENTEROTOXIC ACTIVITY OF Salmonella weltevreden CULTURE FILTRATES. (Eng.) Thapliyal, D. C.; Singh, I. P. (Dept. Microbiology and Public Health, G. B. Pant Univ. Agriculture & Technology, Patnagar, India). *Indian J. Exp. Biol.* 16(3):396-398; 1978.

8771 RELEASE OF GASTROINTESTINAL HORMONES INT THE DUODENAL LUMEN OF CATS. (Eng.) Uvn Wallensten, K.; Efendic, S.; Luft, R. (Karolinska Inst., Stockholm, Sweden). *Horm. Metab. Res.* 10(2 173; 1978.

8772 EFFECT OF NITROGEN SOURCE ON NUTRITIONAL MANAGEMENT AFTER SMALL BOWEL RESECTION I RATS. (Eng.) Kishi, T.; Iwasawa, Y.; Itoh, H.; Chibata, I. (Res. Lab. Applied Biochemistry, Tanab Seiyaku Co., Ltd., Osaka 533, Japan). *J. Nutr. Sci. Vitaminol.* 24(2):167-176; 1978.

8773 MORPHOLOGICAL CHANGES IN THE SMALL INTESTINE OF THE CAT FOLLOWING TRANSECTI OF THE VAGAL NERVE. (Eng.) Feher, E.; Csasnyi, K. Vajda, J. (Semmelweis Univ. Medical Sch., Tuzolto utca 58, 1450 Budapest, IX, Hungary). *Acta Anat. (Basel)* 101(3):218-224; 1978.

See also, 8620, 8626, 8630, 8640, 8641, 8681, 8722
8738, 8775, 8776, 8778, 8949, 8994, 9052
9175.

GENERAL

8774 RETROGRADE PANCREATIC PHLEBOGRAPHY WITH SIMULTANEOUS BALLOON OCCLUSION OF PORTAL AND ARTERIAL FLOW. AN EXPERIMENTAL STUDY. (Ger.) Gunther, R.; F bsguth, A.; Georgi, M.; Hohn, P. (Institut fur Klinische Strahlenkunde der Universitat, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Fortschr. Geb Roentgenstr. Nuklearmed.* 128(2):151-155; 1978.

The possibility of visualizing the venous system of the entire pancreas by retrograde portal contract injection (with Angiografin) and simultaneous balloon occlusion of the portal vein, celiac trunk, and superior mesenteric artery was studied in 12 male dogs. Good filling of the major pancreatic veins was achieved in 7/12 dogs. The portal and arterial pressures altered considerably der the experimental conditions. A rise in the vels of serum transaminases was observed only ce, when there was thrombosis of the portal vein d branches of the hepatic veins. Apart from is case, there was no rise in the levels of transinases or of α-amylase. After a total occluon of 40 min (6-min periods of occlusion alterting with 2-5 min of flow), there were only minor stological changes in the liver. Short-term terial balloon occlusion seems feasible in man well, but a transumbilical approach should be osen.

75 BEHAVIOR OF SOME SERUM ENZYMES FOLLOWING LIGATION OF THE SUPERIOR MESENTERIC ARRY IN THE RAT (PRELIMINARY REPORT). (Ger.) Rupecht, H.; Gaida, P.; Keil, E.; Kunath, H.; Klett, (Chirurgische Universitatsklinik und Poliklinik, iedrich-Schiller-Universitat, Bachstrasse 18, R-69 Jena, E. Germany). Z. *Exp. Chir.* 10(6):351-6; 1977.

evaluate serum enzyme tests as diagnostic tools r acute intestinal ischemia, the effect of ligaon of the superior mesenteric artery on some rum enzymes was studied in adult female Wistar ts 0.5-8 hr after ligation. The ligation of the perior mesenteric artery caused marked increases the activities of the serum enzymes (aspartate ino transferase, alanine amino transferase, lipase, pha-amylase, isocitrate dehydrogenase, glutamate hydrogenase) and in the blood sugar level. The partate amino transferase activity increased markly with time between the 2nd and 8th hr, while e alanine amino transferase activity reached its ximum between 3 and 4 hr, the lipase activity beeen 1 and 3 hr, the alpha-amylase activity between and 4 hr, and the glutamate dehydrogenase activity tween 3 and 4 hr. The isocitrate dehydrogenase tivity increased with time between the 2nd and h hr. The changes in the enzyme activities e probably due to the shock and to the reduced flow of portal vein blood to the liver (and us to additional hypoxic damage of this organ). e findings indicate that the serum enzyme tests y be valuable in the diagnosis of early stages of ute intestinal ischemia.

76 EMBRYOLOGY OF THE SPHINCTER OF ODDI. (Eng.) Germain, M.; Martin, E.; Gremillet, *In: The Sphincter of Oddi. Proceedings of the ird Gastrointestinal Symposium, Nice, June 8-9, 76.* (Basel: S. Karger): 1-5; 1977.

8777 CHYLOMICRON REMNANT PARTICLE FORMATION IN VIVO IN HEPATECTOMISED RAT. (Eng.) Vost, A.; Pocock, D. M. E.; Pleet, S. (McGill Univ. Medical Clinic, Montreal, Quebec, Canada). *Adv. Exp. Med. Biol.* 82:139-141; 1977.

8778 A STUDY OF THE MORPHOLOGY AND KINETICS OF EPITHELIAL MIGRATION IN RESPONSE TO GASTROINTESTINAL ULCERATION: A NEW APPROACH TO THE CANCER-ULCER QUESTION. (Eng.) Stemmermann, G. N.; Hayashi, T.; Taki, M. *In: Pathophysiology of Carcinogenesis in Digestive Organs. Proceedings of the 7th Symposium of The Princess Takamatsu Cancer Research Fund, Tokyo, 1976.* (Univ. of Tokyo Press): 37-47; 1977.

8779 SPONTANEOUS COLON CANCER IN RATS. (Eng.) Miyamoto, M.; Takizawa, S. *In: Pathophysiology of Carcinogenesis in Digestive Organs. Proceedings of the 7th International Symposium of The Princess Takamatsu Cancer Research Fund, Tokyo, 1976.* (Univ. of Tokyo Press): 297-304; 1977.

8780 PURIFICATION OF INFECTIOUS PANCREATIC NECROSIS (IPN) VIRUS AND COMPARISON OF POLYPEPTIDE COMPOSITION OF DIFFERENT ISOLATES. (Eng.) Chang, N.; MacDonald, R. D.; Yamamoto, T. (Dept. Microbiology, Univ. Alberta, Edmonton, Alberta T6G 2E9, Canada). *Can. J. Microbiol.* 24(1):19-27; 1978.

8781 STUDIES ON EXPERIMENTAL MIXED INFECTION OF Schistosoma haematobium AND Schistosoma mansoni IN THE ALBINO MOUSE. (Eng.) Halawani, A. A.; Farag, H. F.; Awadalla, H. N. (Medical Res. Inst., Alexandria, A.R.E. 165, El Horreya Av., El Hadara, Egypt). *Tropenmed. Parasitol.* 28(4): 478-480; 1977.

8782 CHARACTERIZATION OF THE IMMUNOCHEMICAL FORMS OF CALCITONIN RELEASED BY A MEDULLARY THYROID CARCINOMA IN TISSUE CULTURE. (Eng.) Goltzman, D.; Tischler, A. S. (Dept. Medicine, McGill Univ., Montreal, Quebec, Canada). *J. Clin. Invest.* 61(2):449-458; 1978.

See also, 8674, 8698, 9020, 9056.

DIAGNOSTIC PROCEDURES

8783 ARTERIOPORTOGRAPHY. (Eng.) Herlinger, H. (St. James' Univ. Hosp., Leeds, England). *Clin. Radiol.* 29(3):255-275; 1978.

The results of 82 arterioportographic (AP) examinations of 78 patients are described. Because splenoportography (S) can give inadequate or misleading information and because there are contraindications and serious potential complications associated with its use, AP has superseded it in the study of portal hypertension. There are no contraindications to AP, complications are totally avoidable, and the information obtainable comprises both the arterial and venous phases, encompasses the entire portal system, allows a limited estimate of flow dynamics, and contributes to planning for shunt surgery. The technique of AP involves the catheterization of the celiac and superior mesenteric arteries, of the inferior vena cava, and of the hepatic veins. In the cases reported, arterial phase findings included retroperitoneal malignancy (4), hepatoma complicating cirrhosis (5), pancreatitis, hepatic artery occlusion (underperfusion, 2), and a nontraumatic communication between the left hepatic artery and the left portal vein (1). Splenic artery catheterization and injection of an adequate amount of contrast medium, with good flow through the spleen, provided pictorial information virtually equal to that obtained by S. Venous phase information included morphological inadequacy (portal vein [PV], 2; splenic vein [SV], 4; superior mesenteric vein [SMV], 6), abnormality of flow (hepatofugal PV, 3; slow tidal SV, 8), occlusion (PV, 5; SV, 13; SMV, 5), and presence of thrombus (PV, 6; SMV, 11). Aids to interpretation of venous phase data are given with the warning that S should not be used to confirm the diagnosis of SV occlusion as hemorrhage from the spleen could occur. Wedged hepatic venography was discussed although it was not used formally in the current study to grade the severity of cirrhosis or to test for portal flow reversal. Criteria for the use or avoidance of mesocaval and distal splenorenal shunt procedures and for the use of percutaneous transhepatic portal catheterization and/or AP in the management of patients with portal hypertension are presented. The study demonstrates that AP is an angiographic method with comprehensive diagnostic potential, which is management oriented and useful for determining the suitability of patients for specific shunt surgery.

8784 CONCLUSIONS OF LP-X DETERMINATION IN MORE THAN 2,500 PATIENTS. (Eng.) Eder, G.; Weiss, W.; Neumayr, A.; Schuller, J.; Baumgartner, G. (Immuno Diagnostika, Vienna, Austria). *Protides Biol. Fluids Proc. Colloq.* 25:341-347; 1977.

The results of two different studies on the determination of serum lipoprotein X (LP-X) levels for the detection of extra- or intrahepatic cholestasis are presented. In one study, 800 healthy subjects were screened for LP-X, none of whom were found to have this factor in the serum. In the other study, 1,805 patients in a gastroenterology department were tested, 1,570 of whom had histologically confirmed hepatobiliary disease. The first LP-X test was positive in 28.9% of these patients. However, different results were recorded at follow-up 1 week later in 23.3% of 257 patients and at follow-up 2 weeks later in 51.5% of 68 patients. The LP-X test was positive in 92.8% of 181 cases of cholestasis. The test was positive in 77.6% of 165 patients with alcoholic liver diseases, in 63.7% of 91 patients with hepatitis B surface antigen (HBsAg)-positive acute hepatitis, in 50.0% of 66 patients with HBsAg-negative acute hepatitis, in 42.4% of 33 patients with chronic active hepatitis, and in 2.9% of 34 patients with chronic persistent hepatitis. LP-X was present in the sera of 44.4% of 54 patients with primary liver cancer, 48.8% of 170 patients with liver metastases, 5.1% of 99 patients with a tumor but no liver metastases, and in 23.3% of 194 patients with hematologic malignancies. LP-X occurred in 73.9% of 23 patients with osteomyelosclerosis but in less than 31% of other patients with hematologic diseases. The LP-X test was positive in 28.4% of 95 cases of cholelithiasis, 88.9% of 27 cases of cholelithiasis, and 35.0% of 40 patients with inflammatory bowel disease. LP-X testing is useful in the diagnosis of intra- and extrahepatic cholestasis.

8785 CHOLANGIOGRAPHIC APPEARANCE OF THE INTRAHEPATIC BILE DUCTS. (Eng.) Wojtowicz, J.; Karwowski, A. (Katedra Radiologii AM, ul. Szkolna 8/12, 61-833 Poznan, Poland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(5):417-421; 1977.

The value of percutaneous transhepatic cholangiography (PTC) in the diagnosis of intrahepatic bile duct diseases was assessed by examining the cholangiographic appearance of the intrahepatic bile ducts in 134 cases. The patients underwent the procedure for gallstone disease (23 cases), evaluation of complications of gallbladder surgery (21), chronic pancreatitis (6), liver cirrhosis and chronic hepatitis (4), gallbladder or bile duct neoplasms (31), pancreas or papilla neoplasms (36), or liver neoplasms (13). Satisfactory filling of the peripheral bile ducts was obtained after drainage of bile and with the injection of a somewhat increased quantity of contrast medium into the biliary system. Generalized dilatation of the intrahepatic bile ducts was observed in all cases of mechanical obstruction. PTC was effective in detecting malignant neoplasms: the incidence of true positives was 36/40 and the incidence of true negatives was 89/94. The predictive value of a positive result was 36/41. Advanced liver cirrhosis with extrahepatic bile obstruction was characterized by PTC by dilatation with pronounced crowding and tortuosity of the bile ducts. Multiple abscesses associated with cholangitis were an incidental finding of PTC; these appeared as extravasations of contrast medium into the liver parenchyma communicating freely with the biliary system. The PTC appearance of surgical lesions of the choledochal duct, necrosis of a metastatic tumor, and of cystic dilatations of the peripheral branches of the biliary system are illustrated. These results show that PTC can be useful in the diagnosis of intrahepatic disease.

786 PLASMA BILE ACIDS FRACTIONATION BY GAS-
LIQUID CHROMATOGRAPHY: APPLICATION TO
EPATOCELLULAR DEFICIENCY INVESTIGATION. (Fre.)
ereziat, G.; Pepin, D.; Wolf, C.; Polonovski, J.
Laboratoire de Chimie Biologique, CHU Saint-Antoine,
7, rue Chaligny, 75571, Paris Cedex 12, France).
athol. Biol. (Paris) 25(8):559-564; 1977.

he four major bile acids, cholic, chenodeoxy-
holic, deoxycholic, and lithocholic acids, were
easured in plasma from patients with atresia of
iliary tract (3), viral hepatitis (5), and cir-
hosis (12), including alcoholic and posthepatic
isease. The method used was that of Nair em-
loying gas-liquid chromatography. Normal levels
stablished in this series were compared with
hose reported by other authors. In the presence
f cholestasis, the ratio of chenodeoxycholic acid
o cholic acid was equal to or less than one; when
epatic deficiency developed, the ratio of cheno-
eoxycholic acid to chclic acid was higher than
ne. A very high ratio was considered indicative
f progressive hepatic deficiency. Three patients
ith high levels of lithocholic acid had hepatic
isease with a fatal outcome.

787 COMPUTED TOMOGRAPHY OF THE GALLBLADDER.
(Eng.) Havrilla, T. R.; Reich, N. E.;
aaga, J. R.; Seidelmann, F. E.; Cooperman, A. M.;
lfidi, R. J. (Cleveland Clinic Foundation, 9500
uclid Ave., Cleveland, OH 44106). *Am. J. Roent-
enol.* 130(6):1059-1067; 1978.

linical experience with computer tomography (CT)
n 79 patients with suspected gallbladder disease
s presented. CT accurately diagnosed stones within
he gallbladder, either radiopaque or radiolucent,
n 78% of 50 patients with cholelithiasis. There
ere three false-positive CT examinations. In one
ase, laminated calcifications in the renal paren-
hyma adjacent to the gallbladder were mistakenly
dentified as gallstones. One patient had chronic
holecystitis with a thickened gallbladder wall and
dhesions, and the third had an inflammatory mass in
ne right liver lobe (no calculi). The 11 false-
egative studies included 4 patients with a non-
isualized gallbladder; in 5 patients, calculi were
issed completely. The CT scan correctly identified
of 7 patients with a functioning gallbladder with-
ut stones and 14 of 15 patients with nonfunctioning
allbladders without stones. Four patients without
holelithiasis but with either an abscess or gall-
ladder bed inflammation secondary to cholecystitis
ere all identified by the CT examination. One
atient with a nonvisualizing oral cholecystogram
nd negative reading of a plain film of the abdomen
ad a large laminated calculus shown by CT, which
ppeared to be outside the confines of the gall-
ladder and situated in the portal area. At laparo-
omy, a gangrenous gallbladder was found with perfora-
ion of a large gallstone into the liver bed and
orta hepatis. In two cases, the presence of hy-
rops secondary to cystic duct obstruction or to
ommon bile duct stones were noted on the CT scan.
he observations in these patients suggest that
anifestations of gallbladder disease such as hy-
rops, opaque and nonopaque gallstones, chronic
cholecystitis with thickened inflammatory walls, and secondary liver abscesses can be detected by CT. It is a useful technique for individuals in whom the gallbladder has failed to opacify on oral cholecystography, and can be a useful alternative to conventional radiographic or ultrasound examinations, giving an overall diagnostic accuracy greater than 80%.

8788 COMPUTED TOMOGRAPHY OF THE PANCREAS. (Eng.) Moss, A. A.; Kressel, H. Y. (Univ. California, Sch. Medicine, San Francisco, CA). *Am. J. Dig. Dis.* 22(11):1018-1027; 1977.

Experience with computed tomography (CT) in the diagnosis of pancreatic diseases is discussed, and numerous illustrations are presented. CT scanning demonstrates the normal pancreas in most cases. It is unusual to image the entire pancreas on a single CT scan. Except in extremely emaciated patients, a layer of peripancreatic fat separates the pancreas from the aorta and enables the superior mesenteric artery to be identified just posterior to the body of the pancreas. In detecting pancreatic abnormality, attention should be paid to alterations in morphologic configuration that produce diffuse or focal areas of pancreatic enlargement, and to nonhomogeneous pancreatic tissue that produces variations in pancreatic tissue density (CT number, attenuation coefficient). The most important sign of pancreatic carcinoma is focal enlargement of the head, body, or tail of the pancreas. When the tumor extends posteriorly, the peripancreatic fat plane may be obliterated by tumor extension. Acute pancreatitis causes either focal or more often diffuse enlargement of the pancreas. In some instances, the peripancreatic fat plane may be destroyed, and differentiation of localized pancreatic enlargement due to pancreatitis from that secondary to carcinoma often cannot be done solely on the basis of CT scanning. The CT scan in chronic pancreatitis may be normal, demonstrate calcific deposits within the pancreas, show an enlarged pancreatic duct, or reveal the pancreas to be small and atrophic. Pancreatic pseudocysts are readily detected by CT scanning due to the marked difference in the attenuation coefficients of pseudocysts and normal pancreatic tissue. The scan in pancreatic abscess characteristically shows an area of pancreatic enlargement that contains multiple ill-defined areas of low attenuation number. Disease within the peripancreatic lymphatic tissue produces a mass on CT scan that may be impossible to distinguish from pancreatic carcinoma. In some instances, however, the fat plane between the aorta, the mass, and the pancreas may be preserved and allow a preoperative diagnosis of peripancreatic lymphoma. CT scanning of the pancreas is a safe, rapid, and effective method of imaging the normal or abnormal pancreas of most patients who have a normal amount of body fat.

8789 CT SCANNING AND ULTRASOUND IN THE EVALUATION OF PANCREATIC PSEUDOCYSTS: A PRELIMINARY COMPARISON. (Eng.) Kressel, H. Y.; Margulis, A. R.; Gooding, G. W.; Filly, R. A.; Moss, A. A.; Korobkin, M. (Univ. California Sch. Medicine, San Francisco, CA 94143). *Radiology* 126(1):153-157; 1978.

A retrospective study of 12 surgically proved cases of pancreatic pseudocysts was carried out to assess computed tomography and ultrasound in the diagnosis of these lesions. Computed tomography correctly demonstrated six of eight uncomplicated pseudocysts and all of four infected pseudocysts. Ultrasound identified seven of the eight uncomplicated pseudocysts and two of the four infected pseudocysts. In the two remaining patients with infected pseudocyts, extensive bowel gas precluded optimal evaluation, and the limited examination failed to reveal evidence of an abnormal pancreatic fluid collection. One case of uncomplicated pseudocyst was missed by both tomography and ultrasound, but dilatation of the intrahepatic and common bile duct was noted. In the other case missed by tomography, scans were suboptimal in a markedly cachectic patient. The results indicate that errors by one modality are due to limitations not shared by the other method. This suggests a basis for the complementary use of computed tomography scanning and ultrasound in the evaluation of suspected pancreatic pseudocysts.

8790 STUDY OF PURE HUMAN PANCREATIC JUICE COLLECTED AFTER SECRETIN AND CERULEIN STIMULATION. (Fre.) Escourrou, J.; Frexinos, J.; Ribet, A. (Clinique des Maladies de l'Appareil Digestif, C.H.U. de Rangueil, F 31054 Toulouse, France). *Gastroenterol. Clin. Biol.* 2(1):29-37; 1978.

Pancreatic function after stimulation by simultaneous continuous infusion of 0.5 U/kg body weight/hr of secretin and 75 ng/kg body weight/hr of cerulein was studied in seven normal men. The patients had fasted for 36 hr and had no premedication except 10-20 mg *N*-butylhyoscine bromide used to produce duodenal hypotony when the catheter for collecting the pancreatic juice was introduced into the main pancreatic duct. The subjects were in the left-side position during the entire examination (60 min) to avoid contamination with gastric secretion. Samples were collected every minute for the first 15 min after injection of secretin and cerulein; thereafter, they were collected every 5 min. There was usually a latent period of 5 min before the pancreatic juice samples actually could be collected, which was attributed to the time the sample took to pass through the collecting catheter. The total collected volume varied from 118-210.7 ml and appeared related to the weight of the subject. The pancreatic juice pH was between 8.2-9.2. Bicarbonates rose to a maximum, varying from 116-140 mEq/l, at about 7-14 min. The sum of the bicarbonates and chlorides remained constant throughout the test for each subject and varied from 145.5 ± 1.7 mEq/l to 153.8 ± 0.9 mEq/l. Proteins, lipase, chymotrypsin, and amylase levels were also measured. The proportions of the different enzymes varied from one subject to another. It is concluded that collection of pancreatic fluid from the main pancreatic duct avoids contamination by bile or gastric juice with minimal danger to the subject.

8791 ^{99m}Tc-LABELED COMPOUNDS IN HEPATOBILIARY INVESTIGATIONS, AS EXEMPLIFIED BY STUDIES WITH HepatoBIDA. (Ger.) Wolf, F.; Kronert, E.; Regler, G. (Institut und Poliklinik fur Nuklearmedizin, Universitat Erlangen-Nurnberg, Krankenhausstrasse 12, 8520 Erlangen, W. Germany). *Fortschr. Med.* 96(9):455-462; 1978.

The pharmacokinetics and diagnostic usefulness of ^{99m}Tc-labeled 2,6-diethylacetanilidoiminodiacetic acid (HepatoBIDA) were studied in normal subjects and 52 patients with hepatobiliary disorders (mech anical obstruction of bile ducts, gallbladder and bile duct inflammation, dyskinesia, hepatic parenchymal lesion, liver metastasis, hydatid cyst, and hepatocellular carcinoma). HepatoBIDA was taken u by the liver very rapidly following the i.v. injec tion of 2-5 mCi. The plasma clearance was 420 ml/ min after 10 min, and 250 ml/min after 30 min (bod surface 1.73 m^2). The experimental studies on the patients showed that it is mandatory to obtain vis ual documentation of the marker passage by sequential scintigrams and to get functional graphs, especially from the complete examination field, the peripheral and central liver regions, the bile transporting system, and the small intestine. At present, the main indications for this examination are in the diagnosis of bile flow obstructio of mechanical or inflammatory origin and in the evaluation of therapeutic measures.

8792 VISUALIZATION OF THE LIVER, BILIARY TREE AND PANCREAS. PART II: RADIONUCLIDE EVALUATION. (Eng.) Spencer, R. P. (Univ. Connecticut Health Center, Farmington, CT). *Clin. Gastroenterol.* 7(2):475-487; 1978.

8793 VISUALIZATION OF THE LIVER, BILIARY TREE AND PANCREAS. PART III: ULTRASOUND SCANNING. (Eng.) Taylor, K. J. W.; Rosenfield, A T. (Yale Univ. Sch. Medicine, New Haven, CT). *Clin. Gastroenterol.* 7(2):488-516; 1978.

8794 EXCRETORY LIVER FUNCTION TESTS. (Eng.) Bircher, J.; Preisig, R. (Inselspital Berne, Berne, Switzerland). *Clin. Gastroenterol.* 7(2):517-528; 1978.

8795 TESTS OF PANCREATIC SECRETION. (Eng.) Wormsley, K. G. (Dept. Therapeutics, Univ. Dundee, Dundee, Scotland). *Clin. Gastroenterol.* 7(2):529-544; 1978.

8796 BILE SALT DECONJUGATION BREATH TESTS AND THE COLONIC FLORA [Letter to Editor

Eng.) Gilat, T.; Levy-Gigy, C.; Peled, Y.
Ichilov Hosp., Tel-Aviv, Israel). *Gastroenterology*
4(2, Part 1):332-334; 1978.

797 INNOMINATE GROOVES OF THE COLON: MORPHOLOGICAL CHARACTERISTICS AND ETIOLOGIC
ECHANISMS. (Eng.) Cole, F. M. (McMaster Univ.
edical Center, Hamilton, Ontario L8S 4J9, Canada).
adiology 128(1):41-43; 1978.

798 COMPARISON OF JUICE OBTAINED DURING DUODENAL ASPIRATION AND CANNULATION
F THE MAIN PANCREATIC DUCT AFTER STIMULATION
ITH EXOGENOUS SECRETIN IN MAN. (Eng.) Osnes,
.; Petersen, H.; Schrumpf, E. (Ulleval Hosp.,
slo 1, Norway). *Scand. J. Gastroenterol.* 13(4):
53-458; 1978.

799 A RADIOTELEMETRY PILL FOR THE MEASUREMENT OF IONISING RADIATION USING A MERCURIC
ODIDE DETECTOR. (Eng.) Hassan, M. A.; Pearce,
.; Edwards, J. P. N. (Univ. Jordon, Amman, Jordon).
ys. Med. Biol. 23(2):302-308; 1978.

800 THE VALUE OF PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY IN THE DIAGNOSIS OF
SEASES OF THE BILIARY TRACT. (Eng.) Middendorp,
G.; Bessler, W.; Gasser, U. (Kantonsspital,
nterthur, Switzerland). *Chir. Gastroenterol.*
(3):337-341; 1977.

01 CHOLEDOCHOSCOPY: A COMPARISON OF A RIGID AND A FLEXIBLE FIBEROPTIC INSTRUMENT.
Eng.) Iseli, A.; Marshall, V. C. (Prince Henry's
osp., St. Kilda Rd., Melbourne, Victoria 3004,
ustralia). *Med. J. Aust.* 1(3):131-132; 1978.

02 THE FEASIBILITY OF ECHOMETRIC DETECTION OF CANCER IN THE LOWER GASTROINTESTINAL
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RACT: PART II. (Eng.) Wild, J. J.; Foderick,
W. (Univ. Cambridge, Cambridge, England). *Am.*
Proctol. 29(2):11-20; 1978.

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w Blvd. at 39th St., Kansas City, KS 66103).
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J. Can. Assoc. Radiol. 29(1):51-55; 1978.

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8807 EARLY FIBEROPTIC PANENDOSCOPY IN ACUTE UPPER GASTROINTESTINAL BLEEDING. (Eng.) Mann, N. S.; Mann, S. K. (Veterans Admin. Hosp., 800 Zorn Ave., Louisville, KY 40202). *Am. J. Proctol.* 29(2):26-29, 31; 1978.

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8809 LP-X IN MATURE AND PREMATURE NEWBORN INFANTS. (Eng.) Lachmann, D.; Eder, G. *In: Protides of the Biological Fluids. Proceedings of the Twenty-Fifth Colloquim, Brugge, 1977.* (Oxford: Pergamon Press): 337-340, 1977.

8810 ONE-HOUR BLOOD XYLOSE TEST: A RELIABLE INDEX OF SMALL BOWEL FUNCTION. (Eng.) Buts, J. P.; Morin, C. L.; Roy, C. C.; Weber, A.; Bonin, A. (Hopital Sainte-Justine, 3175 Chemin de la Cote Ste-Catherine, Montreal, Quebec H3T 1C5, Canada). *J. Pediatr.* 92(5):729-733; 1978.

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8812 A RADIOLOGICAL EVALUATION OF SMALL BOWEL ACTIVITY IN THE ACUTE ABDOMEN. (Eng.) Bryk, D. (Jewish Hosp. and Medical Center, Brooklyn, NY). *C.R.C. Crit. Rev. Diagn. Imaging* 10(2):99-128; 1977.

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8815 THE BILIARY TRACT SYSTEM--A CHALLENGE TO DIAGNOSTIC RADIOLOGY. (Eng.) Frommhold, W. (Medizinischen Strahleninstituts der Universitat Tubingen, Roentgenweg, Tubingen 74, W. Germany). *J. Belge. Radiol.* 60(5):411-422; 1977.

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8817 STRANGULATING OBSTRUCTION OF THE BOWEL: A REEVALUATION OF RADIOGRAPHIC CRITERIA. (Eng.) Bryk, D. (State Univ. New York Downstate Medical Center, Brooklyn, NY). *Am. J. Roentgenol.* 130(5):835-843; 1978.

8818 CLINICAL EXPERIENCE WITH [^{111}In]INDIUM CHLORIDE SCANNING IN INFLAMMATORY DISEASES. (Eng.) Dayem, H. M. A.; Breen, J.; Leslie, E. V. (Dept. Radiology, State Univ. New York at Buffalo, 462 Grider St., Buffalo, NY 14214). *Clin. Nucl. Med.* 3(5):196-201; 1978.

8819 SCANTY INTESTINAL GAS IN INFANTS AND CHILDREN: CLINICAL SIGNIFICANCE AND RADIOLOGIC DIAGNOSIS. (Eng.) Eklof, O.; Lette, E. (Karolinska Sjukhuset, S-104 01 Stockholm, Sweden). *Acta Radiol. [Diagn.] (Stock.)* 19(13): 259-267; 1978.

8820 CLINICAL ESTIMATION OF LIVER SPAN IN INFANTS AND CHILDREN. (Eng.) Lawson, E. E.; Grand, R. J.; Neff, R. K.; Cohen, L. F. (Children's Hosp. Medical Center, 300 Longwood Ave., Boston, MA 02115). *Am. J. Dis. Child.* 132 (5):474-476; 1978.

8821 VALUE OF FIBEROPTIC GASTROINTESTINAL ENDOSCOPY IN INFANTS AND CHILDREN. (Eng.) Graham, D. Y.; Klish, W. J.; Ferry, G. D. Sabel, J. S. (Baylor Coll. Medicine, 1200 Moursun Ave., Houston, TX 77030). *South. Med. J.* 71(5): 558-560; 1978.

8822 A SIMPLE ASSAY TECHNIQUE FOR PANCREATIC LIPASE. (Eng.) Connon, R. E.; Van Kle H.; Knight, W. A., Jr. (St. Mary's Health Center, 6420 Clayton Rd., St. Louis, MO 63117). *Am. J. D Dis.* 23(5):472-475; 1978.

8823 RADIOLOGIC VISUALIZATION OF THE NORMAL DUODENAL MINOR PAPILLA. (Eng.) Op den Orth, J. O. (St. Elisabeth's of Groote Gasthuis, Haarlem, Netherlands). *Fortschr. Geb. Roentgenst Nuklearmed.* 128(5):572-576; 1978.

See also, 8744, 8774, 8775, 8813, 8836, 8873, 88
8901, 8902, 8906, 8926, 8927, 8934, 89
8937, 8938, 8953, 8960, 8962, 8963, 89
8965, 8971, 8975, 9000, 9001, 9025, 90
9038, 9041, 9042, 9043, 9046, 9048, 90
9063, 9072, 9083, 9087, 9092, 9094, 91
9105, 9110, 9114, 9157, 9184, 9198, 92
9201, 9203, 9206, 9207, 9210, 9260, 92

GASTROINTESTINAL DISEASES

ESOPHAGUS

824 ENDOSCOPY IN LYE BURNS OF OESOPHAGUS AND STOMACH. (Eng.) Poelman, J. R.; ausman, R. H.; Hoitsma, H. F. W. (Academic Hosp., ree Univ., De Boelelaan 1117, Amsterdam, Neherlands). *Endoscopy* 9(3):172-177; 1977.

he cases of two patients with caustic esophageal nd gastric injuries following lye ingestion are resented. The patients were a 52-yr-old woman nd a 67-yr-old man. Both presented with oral and haryngeal pain, burning pain behind the sternum nd upper abdomen, and hematemesis. Endoscopic xamination was omitted in the first patient beause of the danger of perforation. About 12 hr fter admission, the patient went into hypovolemic hock, and signs of peritonitis developed. At aparotomy, total resection of the stomach, spleen, nd gallbladder was performed because of massive ecrosis. A perforation was not found, and it was ssumed that the caustic solution had leaked through he stomach causing chemical peritonitis. A panreatic fistula and subphrenic abscess developed uring the postoperative period. Endoscopy was arried out in the second patient 6 hr after adission. Severe erosive, hemorrhagic, fibrinous sophagitis; gastric thrombosis of the superficial essels with hyperemia, edema, erosions, necrotic pots, and hemorrhage; and pyloric atony, hyperemia, nd edema were found. The duodenal mucosa was ormal. The patient was treated conservatively, nd the healing process was followed by repeat ndoscopy. Stenosis did not occur. The authors onclude that the development of the pancreatic fisula and subphrenic abscess in the first patient ight have been averted had endoscopy been performed.

325 ESOPHAGEAL DYSPHAGIA TREATED BY CRICOPHARYNGEAL MYOTOMY. (Eng.) West, E. ., Jr.; Baker, H. W. (Good Samaritan Hosp., Portand, OR 97201). *Am. Surg.* 43(11):703-708; 1977.

he results of cricopharyngeal myotomy in the reatment of 14 patients with dysphagia were analzed, and the technique is reviewed. Surgery is arried out via an oblique incision over the anerior border of the left sternocleidomastoid uscle in its lower one-half. The pharyngeal contrictors are identified and the cricopharyngeus s differentiated by the transverse fibers without midline raphe, and the fibers are divided verically with sharp dissection down to the esophageal ucosa. The incised fibers include the inferior ibers of the inferior pharyngeal constrictors as ell as the superior fibers of the circular esophgeal constrictors to insure complete division of he sphincter. This may also be facilitated by he use of a Foley catheter passed, then inflated nd pulled up by the anesthesiologist. If the yotomy is complete, the esophageal mucosa should ulge through the myotomy site. A small Penrose rain is placed in the retroesophageal space rior to closure of the incision. The patients ranged in age from 46 to 86 yr. Nine were roentgenographically proven to have cricopharyngeal dysfunction. Seven patients with cricopharyngeal hypertrophy without other evident current disease had excellent results from myotomy, including one with remote bulbar poliomyelitis. One patient each with Parkinson's disease, hypopharyngeal carcinoma, amyotrophic lateral sclerosis, and cerebrovascular accident had poor results. There were two complications. One patient had a postoperative hemorrhage that required reexploration and drainage of a hematoma. The other, an elderly patient with a cerebrovascular accident, died of aspiration pneumonitis postoperatively. The accurate diagnosis and treatment of dysphagia depends upon adequate history, examination, and appropriate testing. X-ray evidence, particularly cine esophagram, is the diagnostic medium of choice in cricopharyngeal dysfunction and hypertrophy. Section of this muscle can bring immediate relief of dysphagia in patients with otherwise intact swallowing mechanisms.

8826 EPITHELIAL DYSPLASIA IN CANCEROUS AND NONCANCEROUS ESOPHAGI. (Eng.) Sato, E.; Tokunaga, M.; Sakae, K.; Mukada, T.; Sasano, N. (Kagoshima Univ. Faculty Medicine, Kagoshima 890, Japan). *Tohoku J. Exp. Med.* 124(2):117-128; 1978.

To examine the role of epithelial dysplasia (ED) in carcinogenesis of the esophagus, the incidence of ED in 86 autopsy samples of noncancerous esophagi and its degree in 100 surgical samples of esophageal carcinoma were determined by subserial examination of the autopsy samples and by semiserial examination of the surgical samples. The prevalence, severity, distribution, and histological features of dysplasia were examined in relation to tobacco and alcohol intake in the autopsy cases and in relation to preoperative treatment in the surgical cases. Some degree of dysplasia was found in 55 of the autopsy cases. The higher grades of dysplasia were found in 17 men and in 3 women. Some correlation between the use of alcohol and cigarettes and the inci- the use of alcohol and cigarettes and the incidence and severity of dysplasia was evident but not conclusive due to incomplete data. Extensive use of alcohol appeared to correlate with more severe lesions. A definite increase in incidence and severity of dysplasia occurred with increasing age. In 13 cases, atypical active elongation of the germinal layer simulating the rete ridge was observed. Chronic inflammation, glycogenic acanthosis and hyperplasia of duct epithelium were frequently noted. In 70 of 100 surgical samples, an intimate correlation of carcinoma and dysplasia was observed, the degree of dysplasia being generally more advanced than in the autopsy samples. In 24 instances, the carcinoma was accompanied by extensive dysplasia and in 46 instances by multifocal dysplasia. Multicentric *in situ* carcinoma, frequently surrounded by severe dysplasia, was found in 19 patients. The lesion of invasive carcinoma sometimes did not show sharp demarcation from the surrounding mucosa. The effect of radiation or radiation plus bleomycin therapy on carcinoma tissue is noted. The autopsy data on the higher incidence of higher grades of dysplasia among men correlated with the documented 3.84:1 male/female ratio of death from esophageal cancer in the region. The studies on surgical samples, particularly those with no preoperative therapy, indicate that at least half of the carcinoma of the esophagus arose from the dysplastic epithelium as a precursor lesion.

8827 FIBERENDOSCOPIC MONITORIZED DILATATION OF OESOPHAGEAL STRICTURES IN CHILDREN. (Eng.) Cadranel, S.; Rodesch, P.; Peeters, J. P.; Cremer, M.; Cremer, N. (Dept. Pediatrics, Univ. Brussels, Brussels, Belgium). *Endoscopy* 9(3):127-130; 1977.

Experience with esophageal dilatation in 10 children aged 2 months to 10 yr with acquired esophageal strictures is presented. Causes included peptic stricture (3 cases), lye ingestion (2 cases), radionecrosis (1), extrinsic compression (1), congenital atresia (2), and granuloma (1). There were a total of 55 dilatations, using the classical method with rubber bougies in three patients and a newer technique using metallic olives in the remaining patients. There was one case of perforation, which occurred in a patient with caustic stricture in whom dilatation was accomplished with rubber bougies. The only other complication was laceration, occurring in a patient with congenital atresia who was treated with the metallic olives. The results obtained were judged to be excellent in one case in which metallic olives were used and good in the remainder of these cases. Good results were obtained with the classical method in the two cases without perforation. Relapses occurred in only two patients, both of whom underwent bougienage with metallic olives: in one patient with caustic stricture and in one patient with initial caustic stricture followed by relapse with peptic stricture.

8828 SIMPLIFIED OESOPHAGEAL TRANSECTION FOR BLEEDING VARICES. (Eng.) Johnston, G. W. (Royal Victoria Hosp., Belfast, Northern Ireland). *Br. Med. J.* 1(6124):1388-1391; 1978.

8829 EOSINOPHILIC ESOPHAGITIS IN A PATIENT WITH VIGOROUS ACHALASIA. (Eng.) Landres, R. T.; Kuster, G. G. R.; Strum, W. B. (Scripps Clinic Medical Inst., La Jolla, CA). *Gastroenterology* 74(6):1298-1301; 1978.

8830 ESOPHAGITIS ASSOCIATED WITH HERPES SIMPLEX INFECTION IN AN IMMUNOCOMPETENT HOST. (Eng.) Owensby, L. C.; Stammer, J. L. (Brooke Army Medical Center, Fort Sam Houston, TX 78234). *Gastroenterology* 74(6):1305-1306; 1978.

8831 MALLORY-WEISS SYNDROME WITH ESOPHAGEAL OBSTRUCTION SECONDARY TO ADHERENT INTRALUMINAL THROMBUS. (Eng.) Curtin, M. J.; Milligan, F. D. (St. Mary's Hosp. Medical Center, 707 S. Mills St., Madison, WI 53715). *Am. J. Roentgenol.* 129(3):508-510; 1977.

8832 TREATMENT OF BLEEDING VARICES BY OESOPHAGEAL TRANSECTION WITH THE SPTU GUN. (Eng.) Johnston, G. W. (Royal Victoria Hosp., Belfast, Northern Ireland). *Ann. R. Coll. Surg. Engl.* 59(5):404-408; 1977.

8833 CARCINOMA OF THE ESOPHAGUS: A NEW PROPOSAL FOR THE EVALUATION OF TREATMENT (Eng.) Stoller, J. L.; Samer, K. J.; Toppin, D. I.; Flores, A. D. (Laurel Medical Center, 316-888 W. 8th Ave., Vancouver, British Columbia V5Z 3Y1, Canada). *Can. J. Surg.* 20(5):454-459; 1977.

8834 DOXYCYCLINE ESOPHAGEAL ULCERS. (Eng.) Schneider, R. (St. Thomas Hosp., P.O. Box 380, Nashville, TN 37202). *Am. J. Dig. Dis.* 22(9):805-807; 1977.

8835 DISSEMINATED HISTOPLASMOSIS PRESENTING WITH ESOPHAGEAL SYMPTOMATOLOGY. (Eng.) Lee, J. H.; Neumann, D. A.; Welsh, J. D. (Univ. Oklahoma Health Sciences Center, P.O. Box 26901, Oklahoma City, OK 73190). *Am. J. Dig. Dis.* 22(9): 831-834; 1977.

8836 FLUORESCENCE TECHNIQUE FOR THE VERIFICATION OF VASCULARISATION IN PEDICULATED SEGMENTS OF THE DIGESTIVE TRACT. (Eng.) Garcia Gutierrez, A.; Mederos Pazos, G.; Roque Zambrana, F.; Garcia Funes, O. (Garcia's Hosp., Havana, Cub *Chir. Gastroenterol.* 11(2):193-196; 1977.

8837 MORTALITY FROM ESOPHAGEAL CANCER IN PIEDMONT, ITALY. (Eng.) Pastore, G.; Vigliani, R.; Terracini, B. (Registro dei Tumori per il Piemonte e la Valle d'Aosta, Turin, Italy) *Tumori* 63(4):309-304; 1977.

8838 NISSEN FUNDOPLICATION FOR REFLUX PEPTIC ESOPHAGITIS. (Eng.) Bushkin, F. L.; Neustein, C. L.; Parker, T. H.; Woodward, E. R. *In: Transactions of the Southern Surgical Associ tion Eighty-Eighth Annual Meeting held at The Breakers, Palm Beach, Florida, December 6, 7, 8, 1976.* (Philadelphia: J. B. Lippincott): 88:18 185; 1977.

8839 DIFFUSE ESOPHAGEAL SPASM PROVOKED WITH PROSTIGMINE [Letter to Editor]. (Eng.)

DeJesus, R.; Peternel, W. W.; Orchard, J. L.; Colatrella, A. M. (Mercy Hosp., 1400 Locust St., Pittsburgh, PA 15219). *Gastroenterology* 74(2, Part 1):332; 1978.

8840 EXPERIENCES IN THE TREATMENT OF ESOPHAGEAL CANCER OF THE UPPER AND MIDDLE THORACIC SEGMENT. (Eng.) Nakayama, K. (Nakayama Cancer Res. Inst., Tokyo, Japan). *Surg. Annu.* 9:125-132; 1977.

8841 THE COLUMNAR-LINED (BARRETT'S) ESOPHAGUS. (Eng.) Bremner, C. G. (Dept. Surgery, Univ. Witwatersrand, Johannesburg, South Africa). *Surg. Annu.* 9:103-123; 1977.

8842 THE SIGNIFICANCE OF ABNORMAL DUODENAL LOOP ON RADIOLOGICAL AND CLINICAL CURE IN INFANTS WITH SLIDING HIATAL HERNIA. (Eng.) Thommesen, P.; Gravesen, M.; Garsdal, L. (Municipal Hosp., DK-8000 Aarhus, Denmark). *Pediatr. Radiol.* 6(2):88-91; 1977.

See also, 8807, 8821, 8851, 8860, 8862, 8866, 8886, 8887, 8896, 8907, 9163, 9164, 9231, 9242.

STOMACH

8843 GASTRIC LESIONS IN FAMILIAL ADENOMATOSIS COLI: THEIR INCIDENCE AND HISTOLOGIC ANALYSIS. (Eng.) Watanabe, H.; Enjoji, M.; Yao, T.; Ohsato, K. (Faculty Medicine, Kyushu Univ. 60, 3-1-1, Maidashi, Higashi-Ku, Fukuoka 812, Japan). *Hum. Pathol.* 9(3):269-283; 1978.

A histologic analysis of the gastric lesions accompanying familial adenomatosis coli and an evaluation of the differences between polyps in the gastric antrum and those elsewhere in the body was conducted by x-ray and endoscopy of the stomachs of 22 patients with familial adenomatosis of the colon and rectum in 14 families. Although 7 patients did not have gastric lesions, in 15 of the patients (from 13 families), one or more types of gastric lesion was found. Gastric lesions were found in all 9 patients above the age of 30 yr and in 6 of 11 patients aged 10-29 yr. The lesions (1 in 3 cases, 3 in 1 case, 4 in 1 case, 5 in 1 case, and >5 in 9 cases) were limited to the antrum in eight cases, found elsewhere in the body in five, and present in both the antrum and other sites in two. The most common gastric lesion was the adenoma occurring in the pyloric mucosa, which was found in nine patients. Multiple lesions (maximum number, 43) were found in five cases. While there were no essential histologic differences between the gastric adenomas in the patients with familial adenomatosis coli and those in patients without the disease, the adenomas appeared at younger ages in patients with the disease and were multiple in 55.6% of these cases (versus 21.4% in patients without the disease). Fundic gland polyposis was the second most common gastric lesion in patients with familial adenomatosis coli, occurring in 6 of the 15 patients. The multiple fundic gland polyps, measuring up to 5 mm and limited to the fundic glandular mucosa, were characterized histologically by simple hyperplasia of the fundic glands. Other lesions detected included multiple gastric carcinoma (3), microcarcinoids in the pyloric mucosa (2), and multiple varioliform lesions representing erosive gastritis (2). The density of colonic adenomas was determined. Gastric lesions were found in all nine cases in the high density (innumerable adenomas) group, in four of six cases with a moderate number (500-2,000) of adenomas, and in only two of seven cases with low density of adenomas (50-200). Furthermore, extra-alimentary lesions were found in 9 of the 15 adenomatosis coli patients with gastric lesions but were present in only 1 of 7 patients without them. It is concluded that familial adenomatosis coli, Gardner's syndrome, and Turcot's syndrome are all expressions of the familial adenomatosis coli syndrome. Fundic gland polyposis seems to be the gastric lesion specific to familial adenomatosis of the colon and rectum.

8844 HUMAN NEWBORN HYPERGASTRINEMIA: AN INVESTIGATION OF PRENATAL AND PERINATAL FACTORS AND THEIR EFFECTS ON GASTRIN. (Eng.) Euler, A. R.; Ament, M. E.; Walsh, J. H. (Univ. California, Sch. Medicine, Los Angeles, CA). *Pediatr. Res.* 12(5):652-654; 1978.

Levels of gastrin secretion in newborns and adults were compared and the effect of a variety of prenatal and perinatal conditions on these levels in newborns was investigated. Serum gastrin values were determined by radioimmunoassay in 217 newborn infants and in 802 adults who had peptic ulcer disease symptoms but did not have Zollinger-Ellison syndrome or peptic ulcer disease. In six newborns, the basal acid secretion during the first 8 hr of life was measured and compared with that of 14 children with functional abdominal pain. Newborns had a median gastrin serum of 100 pg/ml while the adult median was 39 pg/ml. Mean values for newborns and adults were 135 and 49 pg/ml, resp., ($p<0.001$). No adult had gastrin levels greater than 200 pg/ml, but 29 newborns had gastrin determinations greater than 200 pg/ml, and 5 had values above 500 pg/ml. None of the 19 maternal medications studied, including oxytocin and atropine, were found to influence the newborn gastrin levels. Of 35 neonatal and maternal factors analyzed, only maternal sickle cell trait and race were shown to influence these levels. Only two mothers in the study had sickle cell trait, and their infants had gastrin levels of 1,000 and 270 pg/ml. Negro newborns had a significantly higher level of gastrin than did either Caucasian or Chicano infants, the mean log gastrin values (2.16%, 2.029%, and 1.97%, resp.) corresponding to serum levels of 147, 93, and 107 pg/ml (F=4.7, significant at 5% level). Serum gastrin levels continued to be elevated through the first 8 hr of life (mean value at 8 hr, 72 pg/ml). The basal acid secretion study demonstrated that the parietal cells of newborns secrete only small amounts of gastric acid in response to the elevated gastrin levels. Compared to the older children, the infants hyposecrete acid in response to gastrin stimulus.

8845 GASTRIC MUCOSAL CELL PROLIFERATION AND IMMUNOGLOBULIN-CONTAINING CELLS IN MENETRIER'S DISEASE.

(Eng.) Hansen, O. H.; Jensen, K. B.; Larsen, J. K.; Soltoft, J. (Bispebjerg Hosp., DK-2400 Copenhagen NV, Denmark). *Digestion* 16(4): 293-298; 1977.

The amount of immunoglobulin-containing cells in the gastric mucosa of six patients with Menetrier's disease was estimated, and the rate of gastric epithelial cell proliferation was studied in four of these patients. The area of cells containing immunoglobulin in the gastric fundic mucosa was calculated as a percentage of the total interstitial area in the lamina propria. The areas of IgA- and IgG-containing cells were within normal limits, but the area of IgM-containing cells was significantly increased (mean 9.5% compared with the normal 2.4 ± 1.8%). In three biopsies from the antrum, the area of IgM-containing cells was increased in only one. Autoradiographic studies in four patients showed that the mean labeling indices in the antral and fundic mucosa (15.2 ± 1.4 and 13.3 ± 2.3, resp.) were not significantly different from those previously reported in patients without gastric disease. The serum IgM levels were normal in all six patients. The results indicate that the number of IgM-containing cells in gastric fundic mucosa is markedly increased. This may indicate that IgM is involved in the pathogenesis of Menetrier's disease or that the increased number of IgM-containing cells is the result of a continuous antigen challenge across the much enlarged epithelial membrane.

8846 FACTORS RELEVANT TO THE OCCURRENCE, RECURRENCE AND HEALING OF CHRONIC GASTRIC ULCER: A STUDY OF AN AUSTRALIAN POPULATION.

(Eng.) Thomas, J.; Greig, M.; Shinners, J.; Piper, D. W. (North Shore Hosp., St. Leonards, 2065, New South Wales, Australia). *Rend. Gastroenterol.* 9(2):109-113; 1977.

To evaluate factors relevant to the development, recurrence, and healing of chronic gastric ulcers, 216 patients with ulcer were compared with controls matched for age, sex, and social grade. Emotional stress was measured by the frequency of 31 "major life events" in 59 patients and controls. Patients in the lower social grades experienced more of these events and had a significantly higher score for the degree of change that these events created in the patients' lives (p<0.05) than did the controls. The personality of 44 patients with ulcer was compared with that of controls, using the self-rating Eysenck Personality Inventory. Men with chronic gastric ulcer were significiantly more neurotic (p<0.01) and less extroverted (p<0.001) than their controls. Forty-three percent of 49 patients with recurrent ulcer had a positive test for urinary salicylates, compared with 24% of their controls (p<0.05). There was no significant difference in the number of positive urinary salicylate tests among 22 patients in remission and their controls. More patients than controls lived alone (p<0.01). In addition, patients reported more tension in the home than did their controls, but the results failed to reach statistical significance. Previous studies linking cigarette smoking with slower ulcer healing or with a greater incidence of recurrence could not be supported in this series. Bed rest, carbenoxolone sodium treatment, and anticholinergic drug therapy also had no influence on ulcer healing in the 54 hospitalized patients studied. Cimetidine was found to be effective in a double-blind controlled trial of 48 inpatients and outpatients.

8847 CLINICAL STUDY ON GASTRIC SECRETION WITH SPECIAL REFERENCE TO PEPSIN SECRETION.

(Eng.) Ito, K.; Inoue, M.; Noda, T.; Kuwano, K.; Takeda, H.; Kasugai, T.; *et al.* (Fukuoka Univ. Sch. Medicine, Fukuoka, Japan). *Gastroenterol. Jpn.* 13 (1):13-20; 1978.

Gastric acid and pepsin secretion were measured in groups of 10-24 patients with peptic ulcer to evaluate the preferential stimulating action of tetragastrin (4 μg/kg, i.m.), cerulein (0.2 or 0.3 μg/kg, i.m.), Histalog (1 and 2 mg/kg, i.m.), and secretin (1 clinical U/kg diluted with 15 ml of distilled water, i.v.). Tetragastrin produced a peak acid concentration and volume 30 min after administratio Acid concentration was significantly (p<0.001) increased over basal secretion. A significant (p<0.0 increase in peptic activity occurred 10 min after stimulation and then decreased gradually. Pepsin output increased 30 min after stimulation. Both doses of cerulein produced significant (p<0.05) increases in acid concentration. Increases in secretory volume and in peptic activity after cerulein injection were not significant compared with basal levels. Histalog produced a high level of peptic activity at 10 min after stimulation, which was maintained up to 30 min and was significantly (p<0.05) different from basal values. The acid concentration increased gradually, and the peak was observed 60 min after stimulation. At 60 min, the acid concentration was significantly

her than basal values ($p<0.01$ for 1 mg/kg and
.001 for 2 mg/kg Histalog). After secretin in-
tion, peptic activity increased significantly (p<
01, peak at 40 min) and acid concentration de-
ased significantly ($p<0.02$, peak at 10-30 min after
mulation). With tetragastrin or cerulein as stimu-
t, the increase in peptic activity depended on
increase in acid secretion. Since only a
ght increase in pepsin secretion was seen when
rulein was used, the authors conclude that ceru-
n stimulates parietal cells but will not stimu-
e chief cells. The increased peptic activity
lowing the increase of acid concentration may be
sed on "wash-out" action caused by increase of
d secretion after stimulation. The secretory
tern observed when Histalog was the stimulant
dicates that Histalog stimulates the chief cells
dependent of acid secretion. Secretin also
imulates chief cells. The results indicate that
stalog is a more adequate stimulant for pepsin
cretion than is gastrin or cerulein.

48 DOUBLE-BLIND STUDY OF CARBENOXOLONE IN GASTRIC ULCER AND EROSIONS. (Eng.) Leh-
la, J.; Karvonen, A. L.; Tunturi-Hihnala, H.
niv. Central Hosp., SF-90220 Oulu 22, Finland).
n. Clin. Res. 10(1):19-23; 1978.

e value of carbenoxolone in the treatment of
stric ulcers and erosions was studied, and its
fects on gastric acid secretion and on serum
strin levels were investigated. In a double-
ind study, 20 patients with chronic gastric
cer and 20 patients with gastric erosions re-
ived either placebo or carbenoxolone sodium (50
) during 6 weeks. All patients also received
tacids and were placed on an anti-ulcer diet.
stroscopy was carried out at the onset of treat-
nt and 3 and 6 weeks after the start of treat-
nt. The ulcers of five patients receiving car-
noxolone healed during the 6-week treatment
riod, whereas ulcers in four patients in the
acebo group healed during this period. Erosions
seven patients receiving carbenoxolone healed
ring the 6-week period, and erosions in 11
tients in the placebo group healed during
is period; in two patients the erosions that
d healed after 3 weeks' treatment recurred
6 weeks. There were no significant dif-
rences at any time during the study in the
aling of gastric ulcers or erosions between the
tients receiving placebo and those receiving car-
noxolone. However, after 3 weeks' treatment,
e patients receiving carbenoxolone were sub-
ctively in better general condition than were the
tients receiving placebo (difference statistical-
significant at the 5% level). No significant
anges in the maximal acid output or in the serum
strin levels were seen in the ulcer or erosion
tients before and after carbenoxolone or placebo
eatment. No cardiovascular side-effects were
ident during carbenoxolone treatment, although
e patient required potassium supplementation.
e small dosage may explain the negligible effect
carbenoxolone on the healing of the gastric
sions and on the low incidence of side-effects
this study.

8849 EFFECT OF ULCER HEALING ON THE PROGNOSIS OF CHRONIC GASTRIC ULCER: FOUR-YEAR FOLLOW-UP. (Eng.) Piper, D. W.; Shinners, J.; Greig, M.; Thomas, J.; Waller, S. L. (Royal North Shore Hosp., Sydney, Australia). *Gut* 19(5):419-424; 1978.

To determine the influence of complete healing at the time of discharge from the hospital on the prognosis of chronic gastric ulcer, 83 patients were followed up for 4 yr after an admission to hospital with a chronic gastric ulcer proven by radiology (index ulcer). The index ulcer healed completely in 50 patients, but was unhealed at the time of discharge in the other 33. Significantly fewer patients whose index ulcer was healed compared with those whose ulcer was unhealed at discharge had had a recurrence by 1 ($p<0.05$), 2, 3, and 4 yr ($p<0.01$) of follow-up. Moreover, the rate of recurrence was significantly greater for those patients with an unhealed index ulcer compared with those with a healed index ulcer ($p<0.05$), and by the end of the 4-yr period, 61% of patients with unhealed compared with 26% of those with healed index ulcers had had a recurrence. Patients over the age of 60 yr with unhealed index ulcers had a significantly poorer prognosis than those of similar age whose index ulcer was healed at discharge ($p<0.025$). The sex of the ulcer patient did not significantly influence ulcer recurrence. Large ulcers ($>57\ mm^2$) were less often healed on initial discharge and were more frequently associated with recurrence at 1 ($p<0.05$), 2 ($p<0.025$) 3, and 4 yr ($p<0.01$) than were smaller ulcers ($\leq 57\ mm^2$). Heavy intake of analgesics adversely influenced the course of patients whose ulcer was unhealed ($p<0.05$), but did not alter the recurrence rate in those whose ulcer was healed. Ulcer recurrence was not influenced by smoking habits or by alcohol consumption.

8850 COMPOSITION OF THE ALKALINE COMPONENT OF HUMAN GASTRIC JUICE: EFFECT OF SWALLOWED SALIVA AND DUODENO-GASTRIC REFLUX. (Eng.) Okosdinossian, E. T.; El Munshid, H. A. (Dept. Physiology, Univ. Khartoum, P.O. Box 102, Khartoum, Sudan). *Scand. J. Gastroenterol.* 12(8):945-950; 1977.

To further substantiate the two-component hypothesis of gastric secretion (i.e., that gastric juice contains an acid and an alkaline component), the composition of alkaline gastric juice from four achlorhydric or hypochlorhydric patients with vitiligo and one patient with pernicious anemia was studied. Saliva swallowing was alternately allowed or prevented, and in this way the contribution of swallowed saliva to the pure alkaline component was assessed. The volume refluxed from the duodenum was estimated to assess the contribution of duodenal juice. Reflux was absent in one patient and negligible in another, while in the remaining three patients, the mean pyloric reflux amounted to no more than 8% of the observed volume. Swallowed saliva had a significant diluting effect on both the Na^+ and Cl^- concentrations ($p<0.01$ and $p<0.001$, resp.), but the K^+ concentration was significantly increased in the alkaline gastric aspirate ($p<0.05$). The composition of alkaline gastric juice, free to an appreciable extent of salivary contamination, was relatively constant. The results are consistent with the two-component hypothesis of gastric secretion.

8851 GASTRIC VOLVULUS UNASSOCIATED WITH HIATAL HERNIA. (Eng.) Pillay, S. P.; Angorn, I. B.; Baker, L. W. (Dept. Surgery, Univ. Natal, Durban, South Africa). *S. Afr. Med. J.* 52(22): 880-885; 1977.

Clinical findings in 16 patients with gastric volvulus not associated with hiatal hernia are reported, and two case reports are presented. Of 10 patients who presented with volvulus unrelated to previous trauma, 3 presented with an acute volvulus, which constituted an abdominal emergency, with either obstruction or strangulation of the stomach, and required surgery. Of the six patients with relevant antecedent trauma, five presented with acute volvulus. Both deaths in this series were associated with an acute presentation. Two patients, who were both in the group with antecedent trauma, developed gangrene of part of the stomach wall, which resulted in the death of one patient before emergency surgery could be performed. All 16 patients presented with abdominal pain and vomiting, but a third common observation in gastric volvulus, i.e., inability to pass a nasogastric tube, was absent in all cases. Severe hematemesis due to gangrene or erosive gastritis occurred in three patients. Contrast studies of the upper gastrointestinal tract confirmed the diagnosis in 14 patients. Congenital diaphragmatic abnormalities were present as a causative factor in four patients. Diaphragmatic defects in the six patients with antecedent trauma were due to blunt or penetrating diaphragmatic injury, which preceded the admission for volvulus by intervals of 6 months to 4 yr. Alimentary tract lesions in the esophagus (1), stomach (2), and duodenum (1) were detected in four patients. In one patient, both a congenital defect of the hemidiaphragm and a gastric ulcer were present. Idiopathic volvulus was diagnosed in four cases. Among the patients without previous trauma, two with mesenterio-axial volvulus responded well to dietary modification. Plication of a congenital eventration of the left hemidiaphragm, gastropexy, and subphrenic transposition of the colon were associated with a good result in one patient, but volvulus recurred after gastropexy and colon transposition in a second patient, in whom a previously unrecognized gastric ulcer was discovered. The presence of an associated gastric ulcer was overlooked in another patient, in whom secondary gastric volvulus was presumed to be due to eventration of the left hemidiaphragm. In three patients with traumatic volvulus, thoracotomy exploration permitted easy reduction and the repair of diaphragmatic defects. Exploration via laparotomy in two patients was associated with great difficulty in dividing intrathoracic adhesions, reducing the volvulus and repairing the diaphragm. The rational management of gastric volvulus involves recognition that the condition may be idiopathic or secondary, treatment of associated conditions on their merits, awareness of diaphragmatic injury as a possible causative factor, and the use of gastropexy and subphrenic colonic displacement where indicated to prevent recurrence.

8852 GASTRITIS Varioliformis: CHRONIC EROSIVE GASTRITIS WITH PROTEIN-LOSING GASTROPATHY. (Eng.) Clarke, A. C.; Lee, S. P.; Nicholson, G. I. (Auckland Hosp., Park Rd., Auckland 3, New Zealand). *Am. J. Gastroenterol.* 68(6):599-602; 1977.

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See also, 8672, 8675, 8687, 8697, 8805, 8821, 8824, 8902, 8903, 8904, 8906, 8907, 8923, 8924, 8992, 9006, 9009, 9028, 9030, 9164, 9210, 9211, 9231, 9233, 9234, 9240, 9242.

STOMACH

Peptic Ulcers

902 VALUE OF THE ^{14}C-GLYCOCHOLATE TEST: INVESTIGATIONS IN PATIENTS WITH BILLROTH-I-RESECTED STOMACHS. (Ger.) Adlung, J.; Raguse, .; Grazikowske, H. (I. Medizinische Klinik, Medizinische Hochschule Lubeck, Kronsforder Allee 71/73, -2400 Lubeck, W. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 38(1):2-7; 1978.

he ^{14}C-glycocholate exhalation test was performed n 34 healthy subjects, 9 patients with Billroth II astric resections and various gastrointestinal iseases (fatty degeneration of the liver, hronic pancreatitis, pernicious anemia, dumping yndrome, jaundice, cholelithiasis, cholestasis, alabsorption, and afferent loop syndrome), and 32 ubjects with Billroth II gastric resections but ithout any gastrointestinal diseases. The ^{14}C-lycocholate was administered as a p.o. dose of 0 μCi of labeled compound (specific activity, 10-0 mCi/mmol). All 41 patients had undergone gastric resection for benign ulcer; the glycocholate est was performed 3-4 weeks after gastric reection in 15 cases and 2-40 yr after surgery in 6 cases. The $^{14}CO_2$ exhalation was normal in the ealthy controls and in the 32 subjects with Billroth II gastric resections without gastrointestinal iseases, but it was significantly and pathologically increased ($p<0.001$) in 7/9 patients with illroth II gastric resections and gastrointestinal iseases. According to the hypothesis that the deconjugation of bile salts is possible only by bacterial enzymes, the pathological test result found in the seven patients can be explained only by the presence of bacteria in the upper segment of the intestinal tract or by the loss of bile salts in these patients.

8903 POSTOPERATIVE ANASTOMOTIC ULCER: A REPORT OF 50 CASES. (Fre.) Boiselle, J.; de Montalier, H. (Hopital Bichat, 170, boulevard Ney, 75018 Paris, France). *Ann. Chir.* 31(8):685-692; 1977.

Postoperative ulcers (termed peptic ulcers or anastomotic ulcers) were studied in 50 patients who had previously undergone ulcer surgery. The average delay in appearance of the second ulcer was as long as 30 yr but was only 4 yr for those with previous gastrectomies and 12 yr for those with previous gastroenterostomies. In 34 patients, the anastomotic ulcers could be attributed to technical errors in the initial surgery, usually incomplete vagotomies (11) or insufficient gastrectomies (21). Patients with previous gastroenterostomies underwent a vagotomy and antrectomy or 2/3 gastrectomy as treatment of the second ulcer. Vagotomies were performed on patients with previous gastrectomies and new vagotomies and antrectomies were done for patients who had initially undergone vagotomies and drainage. Zollinger-Ellison syndrome was found in two patients who had initially been misdiagnosed; they were treated by total gastrectomies. In three patients who developed peptic ulcers after bypass surgery for pancreatic tumors, a modification of the bypass circuit and a new gastroenterostomy were performed. Postoperative mortality was 8/50 but second recurrences occurred in only survivors. It is stressed that successful ulcer treatment must reduce gastric secretion.

8904 THE DEVELOPMENT OF MUCOSAL CHANGES AFTER GASTRIC SURGERY FOR ULCER DISEASE. (Eng.)

Janunger, K. G.; Domellof, L.; Eriksson, S. (Univ. Hosp., Umea, Sweden). *Scand. J. Gastroenterol.* 13 (2):217-223; 1978.

To investigate the relationship between morphological changes occurring after gastric surgery and factors such as age, sex, and time of follow-up, and between morphological changes and the development of stump carcinoma, the development of morphological changes in the body mucosa after partial gastrectomy for ulcer disease was studied early (within 3 yr) and late (10-24 yr) postoperatively in 306 patients. Forty-one patients were studied early after Billroth I resection, 14 early after Billroth II resection, 79 late after Billroth I resection, and 172 late after Billroth II resection for gastric or duodenal ulcer. All patients underwent gastroscopy and six forceps biopsies. When agreement between the different biopsies in the same patient was studied, it was not possible to evaluate 19% of the biopsies for technical reasons. On the average, atrophy was found in 4.4 ± 1.5/6 biopsies. The corresponding figures were 4.6 ± 1.5 for acute gastritis, 4.4 ± 1.5 for chronic gastritis, 2.9 ± 1.6 for cystic dilatation, and 1.8 ± 1.2 for intestinal metaplasia. Duodenal ulcer patients and gastric ulcer patients developed mucosal atrophy, cystic dilatation of the gastric glands, and intestinal metaplasia to a similar extent. There was a significantly greater incidence of cystic dilatation of the gastric glands ($p<0.001$) after Billroth II than after Billroth I resection in the patients in whom the biopsy was taken late after surgery. In the early postoperative Billroth I group, an increased incidence in mucosal atrophy, severe chronic gastritis, and intestinal metaplasia were found with increasing age. However, no difference was found in the late postoperative group, and sex did not affect mucosal changes. There were no further relationships between age or type of operation on the development of mucosal changes. Mucosal atrophy, chronic gastritis, and intestinal metaplasia are regarded to be possible features of malignant transformation. If this concept is true, the present findings may explain why stump carcinoma is frequently reported with an incidence that is independent of preoperative ulcer disease or anastomotic procedure.

8905 GASTROESOPHAGEAL SPHINCTER PRESSURE AND SERUM GASTRIN STUDIES FOLLOWING FOOD INTAKE BEFORE AND AFTER VAGOTOMY FOR DUODENAL ULCER. (Eng.)

Csendes, A.; Oster, M.; Brandsborg, O.; Moller, J.; Brandsborg, M.; Amdrup, E. (Hospital J. J. Aquirre, Santiago, Chile). *Scand. J. Gastroenterol.* 13(4):437-441; 1978.

The interrelationship between serum gastrin concentration and gastroesophageal sphincter pressure (GESP) was studied in the basal state and after food stimulation in six patients with duodenal ulcer, six patients who had undergone parietal cell vagotomy (PCV), six patients who had undergone selective gastric vagotomy with drainage (SGV + D), and six patients who had undergone SGV and antrectomy (SGV + A). No correlation between GESP and the serum gastrin concentration was observed in the basal state. Immediately after food ingestion, a sustained rise in GESP occurred in the duodenal ulcer patients, which lasted at least up to the end of the experiment. GESP after food ingestion at 60 to 100 min was significantly higher than basal values ($p<0.05$). No increase in GESP occurred in any of the operated patients; in fact, a slight decrease occurred. This decrease was not significantly different from basal values, but was significantly different from the GESP values for duodenal ulcer patients from 60 to 120 min after food ingestion ($p<0.01$). Patients with SGV + D showed basal serum gastrin concentrations that were significantly higher than those in duodenal ulcer patients or patients with SGV + A ($p<0.01$), but not different from those of the PCV patients. After food ingestion, an increase in the serum gastrin concentration occurred in all patients with duodenal ulcer as well as in patients after PCV or SGV + D. Patients with SGV + A showed no increase in gastrin level at any period after food ingestion. The mean gastrin concentration was significantly lower at any period of time compared with the values for all other groups ($p<0.01$). Patients with SGV + D showed significantly greater serum gastrin concentration than did duodenal ulcer patients at 15, 60, and 120 min after food ingestion ($p<0.05$). The increase in gastrin level lasted in all groups for at least 120 min after food intake. The results do not suggest that the serum gastrin concentration and extrinsic vagal innervation in the resting state play a significan role in the maintenance of the tone of the gastroesophageal sphincter. After food ingestion, an interaction may occur between intact vagal innervation and a rise in serum gastrin concentration to obtain an adequate rise in GESP.

8906 PROXIMAL SELECTIVE VAGOTOMY: INTRAOPERATIVE CONTROL OF COMPLETENESS. (Ger.)

Jacobs, G.; Baumgartner, H.; Feifel, G.; Martinoli S. (Chirurgische Klinik A, Universitat Dusseldorf, D-4000 Dusseldorf, W. Germany). *Langenbecks Arch. Chir.* 345:217-222; 1977.

The intraoperative control of the completeness of proximal selective vagotomy (PSV) by the modified vagomotor electrotest according to Burge in the treatment of peptic gastroduodenal ulcer is described. The vagomotor electrotest is based upon the loss of motility of the denervated part of the stomach during electrical stimulation of the vagal

runks. The denervated part of the stomach is
eparated from the antrum by a soft clip, and this
art of the stomach is filled with air to a pres-
ure of 60-80 mm H_2O and then connected to a pres-
ure recorder. The PSV is complete if the elec-
rical stimulation of the denervated part of the
tomach causes a pressure rise. The electrotest
as performed in 728 patients; the results were
valuable in 699. Simultaneous pH measurements,
erformed in 678 cases, were evaluable in 441
ases only. The pH test was positive in 68 cases;
he results of the pH test and electrotest coin-
ided in 208 cases. Incomplete PSV was detected
nly by the pH test in 22 cases, while the pH test
as negative in 221 cases in which the electro-
est demonstrated incomplete PSV. The findings
ndicate that the electrotest should always be
erformed during PSV, regardless of how experienced
he surgeon is.

8907 PEPTIC ULCER SURGERY. (Eng.) De Orio, A. J.; Greenlee, H. B. (Veterans Admin. osp., Hines, IL 60141). *Surg. Clin. North Am.* 7(6):1159-1172; 1977.

8908 RESULTS OF ONE HUNDRED HIGHLY SELECTIVE VAGOTOMY SIX MONTHS TO FIVE YEARS AFTER OPERATION. (Eng.) Picaud, R.; Baki, N.; Guidicelli, C.; Anfossi, G.; Dalmas, H. (Hopital Nord, Marseille, France). *Chir. Gastroenterol.* 11(2): 173-176; 1977.

8909 ANTRECTOMY-VAGOTOMY VERSUS HIGHLY SELECTIVE VAGOTOMY. (Eng.) De Vries, B. C.; Muller, H.; Cooke, M.; Rogston, J.; Spencer, J.; Dorricott, N.; Alexander-Williams, J. (Univ. Hosp., Rotterdam, Netherlands). *Chir. Gastroenterol.* 11(2):167-171; 1977.

8910 MAGNESIUM AND GASTRIC ACID SECRETION. (Eng.) Puscas, I.; Nadaban, F.; Voicu, L.; Lerintiu, A.; Kovacs, T.; Blaj, St.; *et al.* (Simleu-Silvaniei-Hosp., Simleu-Silvaniei, Rumania). *Acta Hepatogastroenterol. (Stuttg.)* 24(4):288-292; 1977.

8911 PROSPECTIVELY RANDOMISED TRIAL OF PROXIMAL GASTRIC VAGOTOMY EITHER WITH OR WITHOUT PYLOROPLASTY IN TREATMENT OF UNCOMPLICATED DUODENAL ULCER. (Eng.) Wastell, C.; Colin, J.; Wilson, T.; Walker, E.; Gleeson, J.; Zeegen, R. (Westminster Hosp., London SW1P 2AP, England). *Br. Med. J.* 2(6091):851-853; 1977.

8912 SELECTIVE INTUBATION OF THE AFFERENT LOOP. (Eng.) Ho, C. S.; Lipinski, J. K. (Toronto General Hosp., 101 College St., Toronto, Ontario M5G 1L7, Canada). *Am. J. Roentgenol.* 130(3):481-484; 1978.

8913 CIMETIDINE AND SERUM PROLACTIN. (Eng.) Majumdar, S. K.; Thomson, A. D.; Shaw, G. K. (Greenwich District Hosp., London SE10, England). *Br. Med. J.* 1(6110):409; 1978.

8914 EFFECT OF A NEW ANTACID ON BASAL AND MEAL-STIMULATED GASTRIC SECRETION. (Eng.) Sun, D. C. H.; Rider, J. A. (Good Samaritan Hosp., 1033 E. McDowell Rd., Phoenix, AZ 85006). *Am. J. Gastroenterol.* 69(3, Part 1):283-288; 1978.

8915 GIANT DUODENAL ULCER: A DANGEROUS VARIANT OF A COMMON ILLNESS. (Eng.) Klamer, T. W.; Mahr, M. M. (Univ. Louisville Sch. Medicine, Louisville, KY 40201). *Am. J. Surg.* 135(6):760-762; 1978.

8916 SECRETIN SECRETION IN PATIENTS WITH DUODENAL ULCER, CHRONIC PANCREATITIS, AND DIABETES MELLITUS. (Eng.) Ohara, H.; Inabe, S.; Yabu-Uchi, S.; Ohta, H.; Wada, T. (Sapporo Medical Coll., S-1, W-16, Chuoh-ku, Sapporo City, 060 Japan). *Gastroenterol. Jpn.* 13(1):21-27; 1978.

8917 INHIBITION OF GASTRIC SECRETION BY INTRADUODENAL HYPERTONIC GLUCOSE IN PATIENTS WITH DUODENAL ULCER. (Eng.) Hirata, T.; Tani, M.; Yamagishi, T.; Shimazu, H. (Faculty Medicine, Univ. Tokyo, 3-1 Hongo 7, Bunkyo-ku, Tokyo, 113 Japan). *Gastroenterol. Jpn.* 13(1):28-32; 1978.

8918 INTERRELATIONSHIPS BETWEEN THE CHOLINERGIC INFLUENCES, GASTRIC MUCOSA Na^+-K^+-DEPENDENT ATPase, ATP, ADP, IONS OF GASTRIC JUICE AND BASAL SECRETION IN PATIENTS. (Eng.) Mozsik, G.; Kutas, J.; Nagy, L.; Tarnok, F.; Vizi, F. (Univ. Medical Sch., H-7643 Pecs, Hungary). *Acta Physiol. Scand.* (Special Suppl.):199-208; 1978.

8919 DUODENAL ULCER AND WORKING-CLASS MOBILITY IN AN AFRICAN POPULATION IN SOUTH AFRICA. (Eng.) Segal, I.; Dubb, A. A.; Tim, L. O.; Solomon, A.; Sottomayor, M. C. C. G.; Zwane, E. M. (Baragwanath Hosp., Johannesburg, South Africa). *Br. Med. J.* 1(6111):469-472; 1978.

8920 BASAL AND STIMULATED GASTRIN IN DUODENAL ULCER PATIENTS BEFORE AND AT DIFFERENT INTERVALS AFTER HIGHLY SELECTIVE VAGOTOMY (H.S.V.). (Eng.) Lezoche, E.; Marinaccio, F.; Materia, A.; Imperati, L. (III^a Patologia Chirurgica, Universita di Roma, Rome, Italy). *Chir. Gastroenterol.* 11(3): 283-286; 1977.

8921 LATE CLINICAL RESULTS OF VAGOTOMY, ANTRECTOMY AND GASTRODUODENOSTOMY AT THE LESSER CURVATURE FOR THE TREATMENT OF PEPTIC ULCER. (Eng.) Da Silva, A. L.; Meyer, T. N.; Borges, T. J. A. (Universidade Federal de Minas

Gerais, Sch. Medicine, Belo Horizonte, Brazil). *Chir. Gastroenterol.* 11(3):291-295; 1977.

8922 A STUDY OF THE VARIATIONS IN THE RESPONSE REGARDING DUODENAL ULCER WHEN TREATED WITH PLACEBO BY DIFFERENT INVESTIGATORS. (Eng.) Sarles, H.; Camatte, R.; Sahel, J. (Unite de Recherches de Pathologie Digestive, U-31 INSERM, 46, chemin de la Gaye, F-13009 Marseille, France). *Digestion* 16(4): 289-292; 1977.

8923 CHANGES IN GASTRIC SECRETION FOLLOWING ADMINISTRATION OF PREPARATIONS AFFECTING THE PARASYMPATHETIC AND SYMPATHETIC NERVOUS SYSTEM. (Eng.) Abasov, I. T.; Iof, I. M. (Azerbaijan Gastroenterology Center, Baku, USSR). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):144-149; 1978.

8924 CLINICAL USE OF ENDOSCOPIC CONGORED METHOD IN THE FOLLOW-UP OF PATIENTS WITH SELECTIVE PROXIMAL VAGOTOMY. (Eng.) Suzuki, H. (Jikei Univ. Sch. Medicine, Tokyo, Japan). *Therap woche* 28(8):1621-1624; 1978.

8925 CONVENTIONAL MEDICAL MANAGEMENT OF PEPTI ULCERATION. (Eng.) Crean, G. P. (South ern General Hosp., Glasgow, Scotland). *Scott. Med J.* 22(4):288-289; 1977.

See also, 8691, 8821, 8855, 8865, 8878, 8882, 8889 9006, 9210, 9218, 9242.

SMALL INTESTINE

8926 ANGIOGRAPHIC DIAGNOSIS OF INTESTINAL CARCINOID TUMORS. (Ger.) Bardach, G.; Fasching, W.; Raff, M. (Abt. Rontgen, II. Chir. Univ.-Klinik Wien, Spitalgasse 23, A 1097 Vienna, Austria). *Roentgenblaetter* 31(3):155-159; 1978.

Two angiographically documented cases of intestinal carcinoid tumor are described. Carcinoid tumor of the terminal ileum with hepatic metastases was found in the first case and cecal carcinoid tumor without distant metastases in the second. A fibroplastic reaction was found in the mesentery in both cases. The carcinoid tumor in the second patient was strikingly hypervascularized, while most of the primary carcinoid tumors so far described in the literature were hypovascularized. The fibroplastic reaction of the mesentery was indicative of lymph node metastases in both cases. Differentiation between small intestinal carcinoid tumor and Crohn's disease is difficult and often impossible, because mesenteric adhesions seen in Crohn's disease may imitate the typical fibroplastic reaction seen in cases of carcinoid tumor.

8927 ANGIOGRAPHY IN THE DIAGNOSIS OF ILEOCECAL TUBERCULOSIS. (Eng.) Herlinger, H. (St. James' Univ. Hosp., Leeds, England). *Gastrointest. Radiol.* 2(4):371-376; 1978.

To illustrate the use of angiography in the differentiation of ileocecal tuberculosis from Crohn's disease, two case studies are presented. The young women patients presented with pyrexia, abdominal pain, and weight loss. Each had a tender right iliac fossa mass and normal chest x-ray. Barium studies in both patients were consistent with Crohn's disease, showing in case 1, a grossly ulcerated cecum and an irregularly narrowed terminal ileum surrounded by a soft tissue mass and, in case 2, contraction and ulceration of the cecum with the terminal ileum slightly dilated with retained flui material. Very abrupt demarcation between areas of normality and disease were considered unusual. Angiographic findings (including intense vascularity, small artery irregularity, an intensified venous phase, and in case 1, a positive zoning sign) were typical of Crohn's disease. However, i both cases, an enlarged and hyperemic mesenteric lymph node close to the cecum was clearly shown in the arterial and venous phases of the angiograph. Resection and anastomosis was carried out successfully in both cases and confirmation of the ileocecal tuberculosis was obtained at biopsy of the bowel and regional lymph nodes. The incidence of ileocecal tuberculosis, particularly in underdeveloped countries, the similarities and contrast between ileocecal tuberculosis and Crohn's disease the importance of accurate diagnosis, and diagnostic problems are discussed. The angiographic appearance demonstrated in these two patients is a useful diagnostic indicator of tuberculosis etiology. If the findings are confirmed in a larger group, medical antituberculosis therapy might be started without prior biopsy surgery.

8928 EFFECT OF CODEINE PHOSPHATE, LOMOTIL, AN ISOGEL ON ILEOSTOMY FUNCTION. (Eng.) Newton, C. R. (St. Mark's Hosp., London, England). *Gut* 19(5):377-383; 1978.

The effect on ileostomy output of codeine phosphat (C), Lomotil (L), and Isogel (I) was studied in 18 ileostomists living a normal life at home. During a 3-day test period, five subjects took C (60 mg, t.i.d.), seven took L (diphenoxylate, 2.5 mg and atropine, 0.025 mg/tablet, 2 tablets t.i.d.), and

x took I (Ispaghula husk, 15 ml or 6 g, t.i.d.).
n one of the test days, a mouth-to-stoma transit
tudy was conducted. Total ileostomy output and
utput of water were significantly increased by I
+250 g/24 hr, $p<0.01$), significantly decreased by C
-236 g/24 hr, $p<0.05$), and decreased by L (-57 g/24
-). The mean weight of fecal solids was signifi-
antly increased by I (19 g/24 hr, $p<0.01$) but was
ot significantly changed by C or L. The proportion
f fecal solids was unchanged by I or L but was sig-
ificantly increased by C (2% increase, $p<0.05$).
he ileostomy outputs of sodium and potassium in-
reased ($p<0.01$) in response to I, but decreased in
esponse to C and L ($p<0.05$) without change in their
oncentrations. The output of fecal fat rose signifi-
antly in response to C (from 6.1 to 9.6 g/24 hr, p<
.05). The total ileostomy output ranged from 383
o 1,335 g/24 hr in 16 of the patients. Two patients
n L had total ileostomy outputs greater than 3 kg/
4 hr. The effect of L in these patients was simi-
ar to its effect in patients with lower total out-
uts. The excessive ileostomy output was related to
xtensive ileal resection in these patients. The
outh-to-stoma transit study showed no significant
hanges due to I or L. In the patients using C, the
ransit was slower, although not statistically sig-
ificant, in four of the five subjects. The possi-
le reasons for this negative correlation between C
nd transit time are discussed along with the rea-
ons why L appears to be less effective than C in
he present study. The authors conclude that C and
are effective in reducing the ileostomy loss of
ater and electrolytes, while I increases their loss
nd can aggravate depletion in patients with exces-
ive fluid effluents. The increase in fecal fat
ssociated with C use suggests that it should be
topped before collecting samples for fecal fat
eterminations.

929 RADIOLOGIC EVALUATION OF THE CONTINENT (KOCK) ILEOSTOMY.

(Eng.) Montagne, J.
.; Kressel, H. Y.; Moss, A. A.; Schrock, T. R.
Univ. California Sch. Medicine, San Francisco, CA).
diology 127(2):325-329; 1978.

he surgical procedure for constructing an ileos-
omy with an ileal reservoir, a continent (Kock)
leostomy, and the radiographic features of normal
nd malfunctioning continent ileostomies are de-
cribed. In the surgical procedure, approximately
0 cm of ileal loop is sutured to itself, the
owel is cut, and the ileal loop is opened. The
eservoir is manufactured by folding and suturing
he distal part of the loop to the proximate end.
nipple valve is created by intussusception of
-5 cm of distal ileum into the lumen of the re-
ervoir. Radiographically, the normal ileal re-
ervoir is usually seen as a slightly lobulated
as-filled structure in the middle or right side
f the pelvis. Unemptied, the reservoir may simu-
ate a pelvic abscess on plain film. Using a con-
rast agent administered p.o. or retrograde by
eans of an ileostomy enema, the oval shape of the
leal reservoir and the fine, feathery, nonedema-
ous appearance of the ileal mucosa in the reser-
oir and the proximal ileal segment are seen. The
erminal invaginated ileal segment resembles an inverted nipple protruding into the pouch. This normal finding should not be mistaken for a mass or intussusception. Absence of this filling defect indicates prolapse of the nipple valve out of the nipple pouch, and surgical revision is required. The site of a small bowel obstruction can be determined by means of either small bowel follow-through examination or an ileostomy enema administered retrograde with reflux into the proximal ileum. When abscess formation is suspected, an abdominal radiograph should be made after the reservoir has been drained; the abscess will remain visible in the emptied reservoir. If anastomotic breakdown is suspected, a radiographic examination using water-soluble, iodinated contrast medium administered retrograde through the ileostomy will demonstrate extravasation of contrast medium outside the reservoir. Nonspecific ileitis and recurrent granulomatous disease of the ileal reservoir or proximal ileum show radiographically irregular, thickened, blunted mucosal folds in the pouch and ileum. Endoscopy and mucosal biopsy may be needed to detect a recurrence of Crohn's disease.

8930 DUODENAL MUCOSAL DAMAGE ASSOCIATED WITH CHRONIC USE OF ANTI-INFLAMMATORY DRUGS.

(Eng.) Tanaka, M.; Uchiyama, M.; Ikeda, S. (Higashi-Kunisaki Koiki Hosp., 1456 Shimoharu, Aki-cho, Higashi-Kunisaki-gun, Oita 873-02, Japan). *Endoscopy* 9(3):136-139; 1977.

Three cases of multiple duodenal erosions or ulcers associated with the long-term use of anti-inflammatory agents are presented. The first patient was a 58-yr-old man who had ingested various analgesics (ibuprofen, diclofenac sodium with aminopyrin, phenacetin, and caffeine; buffered aspirin with aminopyrin, phenacetin, and caffeine; and buffered aspirin with aminopyrin, phenacetin, and caffeine) for various periods over 15 months for spastic muscle aches associated with quadriplegia due to traumatic cervical cord injury. The patient developed massive hematemesis and melena, which ceased after 10 days of treatment; this consisted of withdrawal of p.o. analgesics, bland diet, and antacids. The bleeding was from multiple large ulcers involving the bulbar and postbulbar portion of the duodenum. The antrum also contained a few erosions. The second patient was a 67-yr-old man who had taken 2.0 g of buffered aspirin p.o. in addition to a rectal dose of 50 mg of indomethacin daily for 10 months to reduce arthralgia. He presented with epigastralgia accompanied by hematemesis. Endoscopy revealed diffuse superficial gastritis with multiple hemorrhagic erosions, which were most numerous in the antrum. Shallow, actively bleeding erosions were seen in the duodenum. The third patient, a 47-yr-old woman who had taken ibuprofen (800 mg/day, p.o.) and indomethacin (50 mg/day, rectally) for 10 weeks, presented with hematemesis. Endoscopy showed extensive erosive gastritis with shallow ulceration. Marked congestion, friability and multiple shallow ulcers were seen in the duodenal bulb. This report emphasizes the possibility of duodenal mucosal injury related to anti-inflammatory agents.

8931 BYPASS SURGERY FOR OBESITY. (Eng.) Sorrell, V. F. (Middlemore Hosp., Otahuhu, Auckland, New Zealand). *Aust. N.Z. J. Surg.* 47(5): 656-659; 1977.

8932 IMPROVEMENT IN QUALITY OF LIFE FOLLOWING JEJUNOILEAL BYPASS SURGERY FOR OBESITY. (Eng.) Dano, P.; Hahn-Pedersen, J. (Rigshospitalet, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 12(7):769-774; 1977.

8933 CHRONIC INTESTINAL PSEUDOOBSTRUCTION. (Eng.) Faulk, D. L.; Anuras, S.; Christensen, J. (Univ. Iowa Hosp., Iowa City, IA 52242). *Gastroenterology* 74(5, Part 1):922-931; 1978.

8934 ILEAL DUPLICATION CYST: THE IMPORTANCE OF SODIUM PERTECHNETATE Tc 99m SCANNING. (Eng.) Rose, J. S.; Gribetz, D.; Krasna, I. H. (Mount Sinai Hosp., 100th St. and Fifth Ave., New York, NY 10029). *Pediatr. Radiol.* 6(4):244-246; 1978.

8935 GASTROINTESTINAL HEMORRHAGE FROM ILEAL LEIOMYOMA: UTILITY OF THE COMPLETE REFLUX SMALL BOWEL EXAMINATION. (Eng.) Miller, R. E.; Lehman, G. (Indiana Univ. Medical Center, 1100 W. Michigan St., Indianapolis, IN 46202). *Gastrointest. Radiol.* 2(4):367-369; 1978.

8936 RELATIONSHIP BETWEEN DIETARY CALCIUM AND HYPEROXALURIA AFTER INTESTINAL SHUNT OPERATION FOR OBESITY. (Eng.) Hessov, I.; Holm, C. N.; Hansen, L. P. (Kommunehospitalet, 8000 Arhus C, Denmark). *Digestion* 17(3):268-271; 1978.

8937 FALSE POSITIVE SCAN FOR MECKEL DIVERTICULUM. (Eng.) Tauscher, J. W.; Bryant, D. R.; Gruenther, R. C. (Michigan State Univ. Coll. Human Medicine, East Lansing, MI). *J. Pediatr.* 92(6):1022-1023; 1978.

8938 TECHNIQUE OF SCANNING FOR MECKEL'S DIVERTICULUM. (Eng.) Singh, P. R.; Russell, C. D.; Dubovsky, E. V.; Bridger, W. M. (Univ. Alabama Hosp., Birmingham, AL). *Clin. Nucl. Med.* 3(5):188-192; 1978.

8939 RECURRENT INTUSSUSCEPTION: ANALYSIS OF A SERIES TREATED WITH HYDROSTATIC REDUCTION. (Eng.) Eklof, O.; Reiter, S. (Karolinska Sjukhuset, S-104 01 Stockholm, Sweden). *Acta Radiol.* [*Diagn.*] *(Stock.)* 19(1B):250-258; 1978.

8940 JEJUNO-ILEAL BYPASS FOR MORBID EXOGENOUS OBESITY. (Eng.) Balfour, J. F. (No affiliation given). *Hawaii Med. J.* 37(1):9-15; 1978.

8941 INTRAOPERATIVE LOCALIZATION OF INTESTINAL ARTERIOVENOUS MALFORMATION. (Eng.) Evans W. E.; O'Dorisio, T. M.; Molnar, W.; Martin, E. W., Jr.; Wooley, C. F.; Cooperman, M. (Ohio State Univ. Hosp., 410 W. Tenth Ave., Columbus, OH 43210). *Arch. Surg.* 113(4):410-412; 1978.

8942 HYPERPLASIA OF BRUNNER'S GLANDS, POLYPOID DUODENAL PATTERN AND DUODENITIS. (Eng.) Maratka, Z.; Kocianova, J.; Kudrmann, J.; Pirk, F. (Bulovka Hosp., 18081 Praha 8, Czechoslovakia). *Rend. Gastroenterol.* 9(3):202-209; 1977.

8943 MULTIPLE SMALL BOWEL STRICTURES IN A CHILD AND ACCIDENTAL POTASSIUM CHLORIDE INGESTION. (Eng.) Tresadern, J.; Rickwood, A. M. K.; Spitz, L. (Children's Hosp., Sheffield S10 2TH, England). *Br. Med. J.* 2(6095):1124-1125; 1978.

8944 BOUVERET'S SYNDROME. (Eng.) Sullivan, K. P.; Clemett, A. R.; Ferrara, T. P. (St. Vincent's Hosp., New York, NY). *Am. J. Gastroenterol.* 68(4):399-404; 1977.

8945 UNDERSTANDING THE BOWEL OBSTRUCTION PROBLEM. (Eng.) Wangensteen, O. H. (Univ. Minnesota Medical Sch. Complex, Box 610, Minneapolis, MN 55455). *Am. J. Surg.* 135(2):131-147; 1978.

8946 ENTEROCUTANEOUS FISTULAS OF THE SMALL BOWEL IN CHILDREN (25 CASES). (Eng.) Nihoul-Fekete, C.; Ricour, C.; Duhamel, J. F.; Lecoultre, C.; Pellerin, D. (Hopital des Enfants Malades, Paris, France). *J. Pediatr. Surg.* 13(1): 1-4; 1978.

See also, 8625, 8775, 8781, 8794, 8796, 8805, 8807, 8810, 8811, 8812, 8817, 8819, 8821, 8828, 8842, 8879, 8893, 8894, 8907, 8912, 8949, 8955, 8966, 8992, 8998, 9006, 9047, 9175, 9178, 9192, 9195, 9211, 9227, 9230, 9231, 9233, 9235, 9240, 9247, 9262.

Malabsorption

947 THE ROLE OF VARIOUS CEREALS IN COELIAC DISEASE. (Eng.) Anand, B. S.; Piris, J.; ruelove, S. C. (Radcliffe Infirmary, Oxford, Eng- and). *Q. J. Med.* 47(185):101-110; 1978.

he effects of four different cereals (60 g/day, .o., for 1 month) in celiac disease were assessed n celiac patients in remission on a gluten-free iet. Jejunal biopsy in all five patients who re- eived barley revealed definite evidence of his- ological damage, yet none of the patients exper- enced symptoms. The mean surface to volume ratio efore barley consumption was 30.48, and this de- reased considerably after barley consumption in ll but one patient who had a low ratio to start ith. There was a fall in disaccharidase levels n all five patients ($p<0.05$ for mean levels of ucrase, lactase, and maltase). Two patients re- eived rye. In the first patient, the jejunal bi- psy taken before rye consumption showed partial illous atrophy, whereas the other patient had a ear-normal jejunal mucosa at the start of the tudy. After rye consumption, the biopsy showed n almost complete loss of villi, crypt hypertrophy, nd an increase in chronic inflammatory cells in he lamina propria. The surface to volume ratio ecreased from 22.19 to 12.79. The second pa- ient developed diarrhea, nausea, abdominal dis- omfort, and irritability after consuming rye for weeks. The villi were short and broad, there as crypt hyperplasia with an increase in the num- er of mitotic cells, the inflammatory infiltrate ad increased, and the superficial epithelial cells ere flat with loss of polarity of the nuclei. he surface to volume ratio decreased from 48.64 o 29.20. All three disaccharidases decreased in iopsy specimens from both patients. Neither of wo patients who consumed maize and none of three ho consumed rice developed symptoms or histo- ogical abnormalities in the jejunum. The results ndicate that barley and rye products should be liminated from the diets of patients with celiac isease.

948 VARIATIONS IN THE BLOOD AMINO ACID LEVELS IN CHILDREN WITH CELIAC DISEASE FOLLOWING PECIAL DIET THERAPY. (Ita.) Balli, F. (Istituto i Clinica Pediatrica dell'Universita di Modena, odena, Italy). *Minerva Pediatr.* 29(37):2255-2257; 977.

ata concerning 13 children (aged 8 months-6 yr) with eliac disease are presented. The symptoms included iological and clinical signs of malabsorption when he diet contained gluten, typical histological bnormalities of the duodenal-jejunal mucosa, and linical and biological remission when gluten was ithdrawn from the diet. All of the children had rade III atrophy of the jejunal mucosa. The phase f the disease was determined by the gas chromato- raphy profile of the levels of free amino acids in heir sera. The patients' diets were changed: gluten and lactose were excluded, and an enzymatic hydrolysate of casein was added. Children <1 yr old received 5-6 protein/kg, 12-15 g carbohydrates (glucose, fructose from honey, starch from rice, corn, tapioca, and sucrose from fruit)/kg, and 2.5-3 g of fat/kg daily. Before the diet therapy, the levels of the essential amino acids (particularly valine, isoleucine, lysine, and phenylalanine) were low, while the nonessential amino acids (particularly glycine) were elevated. After only 1 month of diet therapy, while clinical results were not yet evident, there was an increase in the blood levels of several of the essential amino acids (approximate average values were: valine increased from 2 to 5 mg%, isoleucine from 1 to 2 mg%, phenylalanine from 3 to 4 mg%, and lysine from 2 to 4 mg%), while leucine decreased from 3 to 2.5 mg%; there was a decrease in the glycine level (from 4 to 2 mg%). The glycine/valine ratio changed from 2.06 before treatment to 0.47 (normal value is <1) after 1 month of diet therapy. Early clinical improvements followed (changes in mood and in psychomotor and neurological functions). The results demonstrate the correlation between normalization of protein metabolism and early improvement in psychomotor and neurological functions.

8949 FUCOSIDOSIS AND I-CELL DISEASE: A FINE-STRUCTURAL AND SILVER-STAINING STUDY OF ABNORMAL INCLUSION BODIES IN SMALL-INTESTINAL CELLS. (Eng.) Ginsel, L. A.; Cambier, P. H.; Daems, W. T. (Lab. Electron Microscopy, Univ. Leiden, Rijnsburgerweg 10, Leiden, Netherlands). *Virchows Arch.* [*Cell Pathol.*] 27(2):99-117; 1978.

Small intestinal cells of a 14.5-yr-old patient with fucosidosis, a 9-month-old patient with I-cell disease, and three control children (ages 2.5, 9, and 11 yr) with suspected familial celiac disease were studied, with special attention given to the fine structure and silver-staining patterns of abnormal, lysosome-like inclusion bodies. Abnormal inclusion bodies were found in the small intestinal cells of both patients. The silver-proteinate affinity of the stored material in the greater part of these abnormal inclusion bodies demonstrated the presence of mucopolysaccharides and/or glycoproteins. The lamellar structures regularly observed in these vacuoles indicated the storage of lipid-like material. Significantly enlarged lysosome-like bodies in the absorptive cells of these two patients showed the same silver-stain affinity as the Golgi apparatus, the apical vesicles and tubules, and the cell coat on the microvilli of the absorptive cells. Fusions between the apical vesicles and tubules and the lysosome-like bodies, all of which had identical silver-proteinate affinity, were also observed. These findings suggest a regulatory function of the lysosome-like bodies in the transport or secretion of cell coat material that might be of the crinophagic type.

The presence of many abnormal vacuoles in the macrophages of both patients and in the endothelial cells of the patient with fucosidosis indicated that these cells too are involved in lysosomal storage. Numerous abnormal inclusion bodies in the fibroblasts in the small intestine of the patient with fucosidosis were also observed. Abnormal inclusions were also found in the fibroblasts in the small intestine of the patient with I-cell disease. The patient with I-cell disease also showed normal inclusion bodies in peripheral blood lymphocytes and cultured skin fibroblasts. The above findings are compatible with the concept of inborn lysosomal storage disease, which explains the accumulation of material in lysosomal storage vacuoles as a consequence of inadequate degradation due to a deficiency of lysosomal hydrolytic enzymes.

8950 COWS' MILK PROTEIN-SENSITIVE ENTEROPATHY: COMBINED CLINICAL AND HISTOLOGICAL CRITERIA FOR DIAGNOSIS. (Eng.) Iyngkaran, N.; Robinson, M. J.; Prathap, K.; Sumithran, E.; Yadav, M. (Dept. Pediatrics, Univ. Malaya, Kuala Lumpur, Malaysia). *Arch. Dis. Child.* 53(1):20-26; 1978.

Diagnostic criteria for cows' milk protein-sensitive enteropathy were assessed in 15 infants with diarrhea, all of whom were suspected of having this type of enteropathy. Cows' milk was eliminated from the diet for 6-8 weeks. A jejunal biopsy was then carried out, and a repeat biopsy was performed 24 hr after challenge with cows' milk formula. The biopsy appearance was classified on the basis of four parameters: villous morphology under the dissecting microscope, villous/crypt height ratio, epithelial cells, and cellular infiltration. In four infants, no significant alteration was noted in the jejunal mucosa 24 hr after the reintroduction of cows' milk; these infants continue to thrive on cows' milk formula. The biopsy in the remaining 11 patients was considered to be moderately abnormal in 8 and severely abnormal in 3, although the prechallenge biopsy was normal in 4 and mildly abnormal in the other 8. Seven of the 11 infants developed symptoms at 0.5 hr to 2 weeks after challenge, but the other 4 have not yet developed symptoms and are making satisfactory clinical progress on a cows' milk formula. The following set of criteria for cows' milk protein-sensitive enteropathy are proposed: (a) clinical disease (diarrhea with or without vomiting) while receiving cows' milk protein, (b) clinical improvement on a diet free of cows' milk protein, (c) normal or mildly abnormal jejunal histology 6-8 weeks after symptoms subside, and (d) histological relapse, with or without clinical relapse, after reintroduction of cows' milk protein.

8951 FIRST OBSERVATION OF COLLAGEN SPRUE IN AN INFANT. (Fre.) Mougenot, J. F.; Martin, E.; Lemoine, P.; Boccon-Gibod, L.; Fontaine, J. L.; Navarro, J.; *et al.* (Hopital Trousseau, 28, rue du docteur A. Netter, F 75571 Paris Cedex 12, France). *Nouv. Presse Med.* 6(30):2689-2690; 1977.

An unusual case of collagen sprue in a 17-month-old infant is reported. The symptoms of sprue followed a bout of infectious diarrhea that affected the whole family, but only this child developed complications. The complications appeared to consist of protein exudative enteropathy, electrolyte depletion with secondary hyperaldosteronism, and intestinal dyskinesia causing repeated partial occlusion. These symptoms are similar to those observed in collagen sprue in adults with the difference that the intestinal lesions (ulcerous ileitis, collagen infiltration of the intestinal mucosa) were more distal in the infant. A gluten-free diet and a diet without allergens failed to improve the condition. An ileal bypass was performed, but the intestinal fluid exudate persisted and p.o. corticotherapy was initiated followed by i.v. steroids. Only slight improvement occurred and the child died at the age of 3.5 yr after a succession of staphylococcal infections resistant to antibiotics. It was thought that the disease may have been related to an immunopathological reaction to microbial antigens of the intestinal flora. A lymphoblast transformation test with coli bacillus antigens was positive, but other tests for immune deficiencies or allergies were negative.

8952 QUANTITATIVE ANALYSIS OF FECAL FAT DURING LIPASE SUBSTITUTION. (Ger.) Sailer, D.; Arnholdt, W.; Berg, G. (Medizinische Universitatsklinik, Postfach 3560, 8520 Erlangen, W. Germany). *Therapiewoche* 27(52):9353-9357; 1977.

8953 A NEW RADIOIMMUNOASSAY FOR DETERMINING NONPRECIPITATING ANTIBODIES TO GLIADIN IN CELIAC DISEASE AND DERMATITIS HERPETIFORMIS. [Abstract]. (Ger.) Menzel, E. J.; Granditsch, G.; Pehamberger, H.; Winterleitner, H.; Molinari, E. (Institut fur Immunologie, Universitat Wien, Vienna Austria). *Z. Immunitaetsforsch.* 153(4):333; 1977.

8954 THE SYMPTOMS OF CELIAC SPRUE (CELIACA) IN ADULTS. (Dut.) Cluysenaer, O. J. J.; van Tongeren, J. H. M. (St. Radboud Ziekenhuis, Nijmegen, Netherlands). *Ned. Tijdschr. Geneeskd.* 121(3):87-95; 1977.

8955 LACTASE ACTIVITY AND THE MILK INTOLERANCE SYNDROME. (Rus.) Valenkevich, L. N. (Leningrad Inst. Pediatric Medicine, Leningrad, USSR). *Klin. Med. (Mosk.)* 55(2):66-70; 1977.

8956 ENZYME SUBSTITUTION THERAPY OF SECONDARY LACTOSE MALABSORPTION. (Hun.) Frank, K.; Barna, M. (Gyermekgyogyaszati Klinika, Orvostovabbkepzo Intezet, Budapest, Hungary). *Orv. Hetil.* 118(35):2093-2095; 1977.

957 NONTROPICAL SPRUE. (Ger.) Heilmann,
E.; Simpson, B. (Medizinischen Poliklinik
er Universitat, Westring 3, 4400 Munster, W. Ger-
any). *Therapiewoche* 27(42):7523-7526; 1977.

958 CLINICAL PICTURE OF WHIPPLE'S DISEASE.
(Ger.) Leinweber, W. (Klinikum, Johann
olfgang Goethe-Universitat, Theodor-Stern-Kai 7,
000 Frankfurt a. M.-70, W. Germany). *Therapiewoche*
7(38):6661-6665, *passim;* 1977.

959 REPORT OF A CASE OF WHIPPLE'S DISEASE
WITH HYPEREOSINOPHILIA. (Fre.) Herreman,
.; Gentilini, M.; Danis, M.; Brucker, G.; Marche,
Cl. (Hopital de la Pitie, F 75634 Paris Cedex 13, France). *Ann. Med. Interne (Paris)* 128(12):973-978; 1977.

See also, 8625, 8796, 8810, 8811, 8933, 9071, 9165, 9216, 9223, 9232, 9233, 9239, 9241, 9250, 9254.

LARGE INTESTINE

960 PSEUDOMEMBRANOUS COLITIS: 10 CASES.
(Fre.) Tubiana, J. M.; Nordlinger, D.;
hermet, J.; Douvin, D.; Lecomte, A. (Hopital Saint-
ntoine, 184, rue du Faubourg Saint-Antoine, 75571
aris Cedex 12, France). *J. Radiol. Electrol. Med.*
ucl. 58(12):811-818; 1977.

en case histories are presented of patients who
eveloped pseudomembranous colitis after treatment
ith antibiotics. Lincomycin (1.5-2 g/day, p.o. or
-2.4 g/day, i.v. or i.m.) and ampicillin (2 g/day,
.o. or 3-12 g/day, i.v.) were involved in five
ases each (once in association with each other),
taphlomycin (2 g/day, p.o.) in one case, and clin-
amycin (1.2 g/day, p.o.) and thiophenacol (1.5
/day, i.m.) each once in association with linco-
ycin or ampicillin, resp. Duration of treatment
anged from 4-40 days but was usually 5-10 days.
he initial clinical sign was diarrhea in every
ase. Rectoscopy showed a false membrane composed
f fibrin, mucous, leukocytes, necrotic cells, and
pithelial debris. The colon glands were hyper-
rophied and hypersecretory. The characteristic
ppearance of the colon on barium x-ray revealed
iffuse "thumbprint" lacunae, 2-4 mm in diameter,
hich projected slightly into the lumen of the
ntestine when profile x-rays were taken. The
acunae were scattered throughout the left colon
ith intervals of healthy mucosa between them. The
-ray signs regressed, often within a month, after
he antibiotics were discontinued.

961 CEPHALOSPORIN-ASSOCIATED PSEUDOMEMBRANOUS
COLITIS. (Eng.) Hutcheon, D. F.; Milli-
an, F. D.; Yardley, J. H.; Hendrix, T. R. (Johns
opkins Hosp., 601 North Broadway, Baltimore, MD
1205). *Am. J. Dig. Dis.* 23(4):321-326; 1978.

he association of pseudomembranous colitis (PC)
ith the use of the antibiotic, cephalosporin,
as investigated in three cases. In cases 1 and
, the patients had received pre- and postoperative
herapy with cephalothin or cephalexin; in case 3,
the patient had been treated with a 5-day course of cephalexin (250 mg, t.i.d.) for an infected hornet bite. In case 1, symptoms of diarrhea and hematochezia with fever were relieved by discontinuation of cephalothin and initiation of i.v. ampicillin and chloramphenicol therapy. In case 2, diarrhea with small amounts of blood developed within a month of hospital discharge. Cholestyramine treatment (2-12 g/day) was required over a period of 9 weeks. In case 3, fever and diarrhea developing within a week of cephalexin treatment responded to cholestyramine treatment (6-12 g daily for 7 days). In case 1, pseudomembranes were not seen sigmoidoscopically, but acute inflammation in the mucosa and inflammatory exudate on the surface were observed histologically. In cases 2 and 3, sigmoidoscopy revealed pseudomembranes, and inflammation was seen histologically. In case 2, the histologically demonstrable inflammation continued after pseudomembranes disappeared sigmoidoscopically. In all cases, stool cultures were negative for pathogens and the diagnosis of PC was confirmed by rectal biopsy. The incidence of cephalosporin-related colitis was shown to be less common than clindamycin colitis but the authors conclude that cephalosporins should be added to the list of antibiotics (chloramphenicol, tetracycline, lincomycin, ampicillin, and clindamycin) associated with PC. They recommend that a biopsy be performed when antibiotic colitis is suspected even when gross inspection reveals only hyperemia and edema. Demonstration of acute inflammation could alert the clinician to the possible development of PC if antibiotic therapy were continued.

8962 PSEUDONEOPLASTIC SIGMOID DIVERTICULITIS: THE VALUE OF I.V. UROGRAPHY IN DIAGNOSIS. (Fre.) Cugnenc, P. H.; Rouanet, J. P.; Loygue, L.; Nouel, O.; Parc, R. (Hopital Saint-Antoine, 184, rue du Faubourg Saint-Antoine, 75571 Paris Cedex 12, France). *J. Radiol. Electrol. Med. Nucl.* 58(12): 801-806; 1977.

In a group of 160 patients treated for sigmoid diverticulitis in the period 1970-1975, the initial diagnosis on the basis of clinical, radiological, and surgical criteria was pseudotumoral sigmoiditis in 63. Further study, particularly x-ray studies, confirmed the diagnosis in 45/63, but the possibility of the presence of cancer was not eliminated preoperatively in the remaining 18. Clinical, radiological, endoscopic, and surgical exploration of these 18 patients is discussed, and a typical case of so-called pseudoneoplastic sigmoiditis is presented. The average age of patients with sigmoiditis is 58 yr, which is close to average age of a series of 258 patients with cancer of the colon, 62 yr. Functional signs do not differ in the two groups, and endoscopy fails to differentiate between cancer and diverticulitis in about 50% of patients. X-ray studies show extensive inflammatory lesions causing changes and thickening in the intestinal muscle wall. Chronic lesions can invade the mesosigmoid, the retrocolic tissue, and neighboring organs, particularly the bladder. Signs of urinary retention, either clinical or observed by i.v. urography, occur in about 20% of patients with sigmoiditis and may be the only symptom in some cases. I.v. urography was performed in 6 of the 18 patients in this series. Typical bladder signs included pseudotumoral changes in the bladder and evidence of external compression, particularly in the area of the left part of the vesical dome, and of retention.

8963 VASCULAR ECTASIAS OF THE RIGHT COLON.

(Eng.) Sprayregen, S.; Boley, S. J. (Montefiore Hosp. and Medical Center, Bronx, NY 10467). *JAMA* 239(10):962-964; 1978.

The use of angiography in the diagnosis of vascular ectasias of the right colon is described, and the results in 25 patients are presented. In a patient with lower intestinal tract bleeding, a nasogastric tube should be passed to exclude gastric or duodenal bleeding. If the findings in this investigation and in coagulation studies, sigmoidoscopy, and colonoscopy are normal, emergency angiography of the superior mesenteric artery, inferior mesenteric artery, and celiac axis should be carried out, in that order. The technique involves inserting a rectal tube before arterial catheterization. The superior mesenteric artery is catheterized, and the colon is then distended with air. For this artery, 50 ml of a combination of 10% diatrizoate sodium and 66% diatrizoate meglumine is injected at 8 to 10 ml/sec, and filming is at the rate of one film per second for 12 sec, followed by one film every other second for 16 sec. The following angiographic criteria are reliable and important for the diagnosis of vascular colonic ectasias: (a) a densely opacified, dilated, tortuous, slowly emptying intramural vein that remains visualized after the other mesenteric veins have emptied; (b) a vascular tuft, which is best identified in the arterial phase; (c) an early-filling vein, which can be visualized within 4-5 sec; and (d) intraluminal extravasation of contrast medium, refering to a localized, amorphous collection that first appears during the arterial phase of the arteriogram and persists throug out the study. A densely opacified, dilated, tortuous, slowly emptying intramural vein was noted in 92% of the 25 patients with ectasias, and a vascular tuft was present in 74%. An early-filling vein, indicating the presence of an advanced lesion with arteriovenous shunting, was definitely present in 61% and suggested in another 16%. On the basis of previous studies, the authors conclude that vascular ectasias of the right colon are acquired, degenerative lesions that are common in the aging population.

8964 MULTIPLE CAVERNOUS HEMANGIOMAS OF THE COLON.

(Ger.) Wagner, H.; Neugebauer, R.; Bultmann, B. (Rontgendiagnostische Abteilung des Departments Radiologie, Steinhovelstrasse 9, 7900, Ulm/Donau, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):131-134; 1978.

Cavernous hemangioma of the ascending, transverse, and descending colon; the sigmoid; and the rectum was diagnosed in a 26-yr-old man by rectoscopy, double-contrast rectocoloscopy, and arteriography. The patient was hospitalized for recurrent rectal bleeding and abdominal distention. Arteriography demonstrated vascular tumors in the area of the jejunal artery, the left colonic artery, and the superior rectal artery. This rare condition has been described only 53 times in the literature. Subtotal colectomy with cecorectostomy was successful. The excessively frequent defecation observed after surgery was checked by cholestyrami The diagnostic importance of the double-contrast examination of the colon and of selective angiography in the differential diagnosis of this rare condition is stressed.

8965 HISTOCHEMICAL CRITERIA FOR THE DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE IN RECTAL SUCTION BIOPSIES BY ACETYLCHOLINESTERASE ACTIVITY.

(Eng.) Chow, C. W.; Chan, W. C.; Yue, P. C. K. (Royal Children's Hosp., Flemington Rd., Parkville Victoria 3052, Australia). *J. Pediatr. Surg.* 12(675-680; 1977.

Rectal suction biopsies taken from 96 patients wh presented with chronic constipation or intestinal obstruction were examined to determine the histochemical criteria for diagnosis of Hirschsprung's disease (HD) by acetylcholinesterase (ACh) activity. In 37 of the 96 cases, the diagnosis or exclusion of HD was made by searching for ganglion cells in serial paraffin sections, and histochemical patterns were examined retrospectively to determine the features of a positive and a negative reaction. In the 27/37 cases in which HD was excluded histologically, ACh activity showed staining along the luminal bo der and around lymphoid tissue and diffuse staini of the muscularis mucosae and of bundles of cholinergic fibers in the deeper portions of the submucosa; occasionally, some fine discrete cholinergic fibers were also seen in the muscularis mucosae and lamina propria. In the 10/37 cases di-osed as HD, there were two types of positive ction: type A showed coarse discrete choliner- fibers in the muscularis mucosae and the im- iately adjacent submucosa and sometimes in the ina propria, whereas in type B, the lamina pro- a was devoid of or contained only a few discrete ers. The histochemical criterion for a positive ction was therefore chosen as coarse discrete ers in the muscularis mucosae and adjacent sub- osa. In 59 of the 96 remaining cases, the his- hemical reaction was determined first and checked reliability by histological features. In 42/59 cases showing a negative reaction, gan- on cells could be seen without difficulty; in 17/59 cases with a positive reaction, ganglion ls were absent in all but 2. In one of the ter cases, four degenerate ganglion cells were n in the biopsy taken at 5 days of age; how- r, no ganglion cells were seen in a repeat bi- sy at 7 months. In the second case, a few clus- s of well formed ganglion cells were seen in the m specimen; the absence of ganglion cells in the m and 4-cm specimens was, however, consistent h the diagnosis of ultrashort segment HD. It possible that the former case represents an iology for HD that involves destruction of gan- ion cells by viral infection in intra-uterine and ly postnatal life.

56 A SECRETORY EPITHELIUM OF THE SMALL INTESTINE WITH INCREASED SENSITIVITY TO LE ACIDS IN IRRITABLE BOWEL SYNDROME ASSOCIATED TH DIARRHOEA.

(Eng.) Oddsson, E.; Rask-Madsen, ; Krag, E. (Herlev Univ. Hosp., DK-2730 Herlev, mark). *Scand. J. Gastroenterol.* 13(4):409-416; 78.

determine the cause of malabsorption of water d electrolytes in patients with irritable bowel ndrome with associated diarrhea (IBSD), perfusion dies of the ileum and jejunum were performed in patients with IBSD and compared with identical dies in 10 normal subjects. Simultaneous mea- ements were made of the net movements of water d electrolytes; the lumen to plasma and plasma lumen fluxes of Na, K, and Cl; and the trans- al electrical potential difference (PD) in re- nse to perfusion with glycochenodeoxycholic id (GCDC) at concentrations of 0.25, 0.5, 1.0, 5, and 2.5 mM. In normal subjects, solutions taining 1 mM GCDC stimulated ileal absorption <0.05), while further increases of bile acid ncentration reduced fluid absorption and evoked t secretion. Patients with IBSD showed fluid cretion even when no bile acid was present. eir mean water movement was significantly ($p<0.05$) fferent from that of normal volunteers. In- eased absorption occurred at GCDC concentration 0.25 mM; concentrations above this level in- eased secretion. Expressed graphically, the tient curve is seen as a parallel transposition the normal curve to the secretory side and lower concentrations of bile acids, suggesting increased sensitivity of the secretory epithel- m to the stimulus of GCDC in the patients. In- eased plasma to lumen fluxes appeared to be sponsible for the spontaneous secretion of Na and Cl in IBSD. GCDC reduced the lumen to plasma fluxes of Na and Cl equally in both groups. Therefore, the ileal epithelium in IBSD patients responds normally to GCDC, but may be prestimulated by some other biological mechanism involved in intestinal secretion. The jejunal patterns were similar to the ileal. No changes in the transmural PD were demonstrated. The authors foresee therapeutic implications in the conclusions that the small intestinal epithelium in IBSD, besides being prestimulated by some as yet unidentified agent, shows an increased sensitivity to the stimulus of GCDC.

8967 PRIMARY LINITIS PLASTICA OF THE COLON: REPORT OF TWO CASES AND REVIEW OF THE LITERATURE.

(Eng.) Amorn, Y.; Knight, W. A. (St. Mary's Health Center, 6420 Clayton Rd., St. Louis, MO 63117). *Cancer* 41(6):2420-2425; 1978.

Two cases of primary linitus plastica of the colon (scirrhous carcinoma of the signet ring cell type) are reported along with a review of 20 cases in the literature. A 61-yr-old man had a two-month history of bilateral cramping abdominal pain and diarrhea, a 20-pound weight loss, and five to six watery stools/day containing occult blood. Colonoscopy demonstrated a stricture of the sigmoid colon at 40 cm and a 1-cm polyp distal to the stricture. An air contrast barium enema showed a 5-cm constriction in the mid-sigmoid area with overhanging edges at both ends. Sigmoid resection with end-to-end anastomosis of the colon was performed. A 20-yr-old man had a 3-month history of diarrhea, anorexia, a 20-pound weight loss, and loose watery stools numbering 6-12/day and containing gross and occult blood. Rectal examination showed an indurated area 2-3 cm from the anal verge. At operation, a firm constricting lesion of the rectum was removed with the regional lymph nodes. There was no evidence in either case of disease of the stomach, liver metastasis, or ascites. Pathological studies revealed thickening of the intestinal wall by diffuse infiltrating tumor cells of the characteristic signet cell type and diffuse fibrous tissue throughout the lesion. In the second case, fibrous tissue was especially prominent and cells were very undifferentiated. The most common symptoms of primary linitus plastica were changes in bowel habit (75%), pain and cramps (70%), and blood in stool (gross, 50%; occult, 20%). Characteristic clinical features include a younger age of presentation (average age 56 yr versus 60-70 yr for carcinoma of the colon); a low incidence of hepatic, lung, and bone metastasis ($\leq 15\%$ each); and a high incidence of ovarian (60%) and lymph node-adipose-peritoneal (80%) metastases. The mean duration of survival after diagnosis is only 8.3 months.

8968 RECTAL NECROSIS OF ISCHEMIC ORIGIN: "SPONTANEOUS" AND FOLLOWING AORTO-ILIO-FEMORAL ANGIOPLASTY AND LUMBAR SYMPATHECTOMY.

(Fre.) Saegesser, F.; Roenspies, U.; Garcia-Gil, A.;

Boumghar, M. (Service universitaire de chirurgie "A" Chuv, Lausanne, Switzerland). *Chirurgie* 103(10): 907-921; 1977.

Two cases are reported of rectal necrosis attributed to ischemia, and prevention of ischemia of the gastrointestinal tract after infrarenal angioplasty of the iliac aorta is discussed. The first patient, a 62-yr-old man, developed ischemic proctitis with necrosis after an angioplastic operation that involved the aorta and iliac and femoral vessels. However, it is concluded that the ischemia was the result of the low blood flow in pelvic vessels that were obstructed or stenosed. Segmentary resection of the distal part of the sigmoid colon and the upper two-thirds of the rectum was performed on this patient. The surgical specimen showed gangrenous necrosis of the entire gastrointestinal wall with edema and bloody effusion. One year after surgery, rectoscopy showed cyanotic mucosa but no macroscopic ulceration. The second patient, a 68-yr-old man, had necrotic ischemia of the rectal wall as a consequence of repeated episodes of low cardiac output due to paroxysmal tachycardia associated with the Wolff-Parkinson-White syndrome. A recto-sigmoidal resection that included the proximal two-thirds of the rectum was performed. The surgical specimen showed total obliteration of the intestinal mucosa by ulceration and necrosis. Recovery from surgery was satisfactory.

8969 Pseudomyxoma peritonei, CLINICAL AND RADIOGRAPHIC FEATURES. (Eng.) Balthazar, E. J.; Javors, B. R. (Metropolitan Hosp. Center, 1901 First Ave., New York, NY 10029). *Am. J. Gastroenterol.* 68(5):501-509; 1977.

8970 MULTIPLE PRIMARY CANCERS AND PROLONGED SURVIVAL: FAMILIAL COLONIC AND ENDOMETRIAL CANCERS. (Eng.) Lynch, H. T.; Bardawil, W. A.; Harris, R. E.; Lynch, P. M.: Guirgis, H. A.: Lynch, J. F. (Creighton Univ. Sch. Medicine, 2500 California St., Omaha, NB 68178). *Dis. Colon Rectum* 21(3): 165-168; 1978.

8971 RISING CARCINOEMBRYONIC ANTIGEN TITERS IN COLORECTAL CARCINOMA: AN INDICATION FOR THE SECOND-LOOK PROCEDURE. (Eng.) Nicholson, J. R.; Aust, J. C. (Upstate Medical Center, 750 E. Adams St., Syracuse, NY 13210). *Dis. Colon Rectum* 21(3):163-164; 1978.

8972 HEPATIC RESECTION FOR METASTASIS FROM COLORECTAL CANCER. (Eng.) Attiyeh, F. F.; Wanebo, H. J.; Stearns, M. W. (Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY 10021). *Dis. Colon Rectum* 21(3):160-162; 1978.

8973 PERINEAL WOUND HEALING AFTER PROCTECTOMY FOR INFLAMMATORY BOWEL DISEASE. (Eng.) Corman, M. L.; Veidenheimer, M. C.; Coller, J. A.; Ross, V. H. (Lahey Clinic Foundation, 605 Commonwealth Ave., Boston, MA 02215). *Dis. Colon Rectum* 21(3):155-159; 1978.

8974 PRECISE DIAGNOSIS IN SEVERE HEMATOCHEZIA. (Eng.) Beychok, I. A. (1880 Arlington St., Suite 304, Sarasota, FL 33579). *Arch. Surg.* 113(5):634-636; 1978.

8975 AETIOLOGY OF ANTIMICROBIAL-AGENT-ASSOCIATED COLITIS. (Eng.) George, W. L.; Sutter, V. L.; Goldstein, E. J. C.; Ludwig, S. L.; Finegold, S. M. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *Lancet* 1(8068): 802-803; 1978.

8976 ANORECTAL ABSCESS FISTULA. (Eng.) Hanley, P. H. (Ochsner Clinic, 1514 Jeffe son Highway, New Orleans, LA 70121). *Surg. Clin. North Am.* 58(3):489-503; 1978.

8977 PRURITUS ANI: A PRACTICAL APPROACH. (Eng.) Sullivan, E. S.; Garnjobst, W. M. (Univ. Oregon Medical Sch., Portland, OR). *Surg. Clin. North Am.* 58(3):505-512; 1978.

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See also, 8779, 8797, 8802, 8803, 8808, 8819, 8843, 8860, 8926, 8933, 8939, 8945, 9028, 9034, 9037, 9223, 9227, 9230, 9231, 9235, 9238, 9240, 9242, 9247, 9250, 9260.

LARGE INTESTINE

Ulcerative Colitis

:4 CLINICAL OBSERVATIONS ON ULCERATIVE
COLITIS. (Eng.) Watanabe, H.; Hiwatashi,
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: incidence, symptoms, clinical features, compli-
:ions, treatment, and prognosis of ulcerative
.itis were studied in 159 patients. These cases
:urred in a total of 102,519 out-patients
Japan between 1954 and 1975, which is 0.15%
gher than was believed to occur. The age dis-
.bution at the initial examination displayed a
ıodal curve in the 79 male patients, with the
.mary and secondary peaks in the second and
:th decades; there was a unimodal curve in
: 80 female patients, with the peak in the
ırth decade. A unimodal curve with the peak in
: third decade was seen in all patients combined.
the 94 patients investigated for blood type, 42%
e group A, 17% group B, 31% group O, and 10% AB.
precursory symptoms in 109 patients with total
left-sided colitis were mucous blood stools in
and abdominal pain in 11%. In 42 patients with
ctitis, 83% had mucous blood stools, 17% had
rrhea, and 14% had abdominal pain. A tempera-
e above 37.5 C, a >15% weight loss, diarrhea
stools/day), increased ESR, anemia, leukocytosis
,000/mm^3), hypoproteinemia (<6.4 g/100 ml), de-
ased albumin/globulin ratio (<1.03), and hypopotas-
ia (<3.5 mEq/l) occurred in 21 of 75, 34 of 73,
of 91, 66 of 90, 43 of 85, 34 of 85, 33 of 86,
of 82, and 11 of 74 patients with total and left-
ed colitis, resp., and in 0 of 27, 3 of 27, 2
34, 11 of 28, 6 of 24, 6 of 24, 4 of 30, 7 of 24,
0 of 19 patients with proctitis, resp. Proc-
igmoidoscopy in 79 of 95 patients with total and
t-sided colitis in the active stage showed rough
granular mucosa, and erosion was present in 62.
se findings were present in 38 of 43 patients
h proctitis. Cytologic findings in 95 patients
h active total and left-sided colitis included
ge numbers of neutrophils and the presence of
sma cells in 90 and 67, resp.; these features
urred in 39 and 29 cases, resp., among 43
ients with proctitis. Biopsy specimens from all
patients showed goblet cell depletion, crypt abscess, and erosion. Complications in 114 patients with total and left-sided colitis included pseudopolyposis (39), toxic megacolon (3), arthritis (8), stomatitis (3), erythema nodosum (1), and erythema exudativum multiforme (1). Complications in 44 patients with proctitis included pseudopolyposis (6) and arthritis (2). Remission was achieved in 65.5% of the cases followed up. Mortality in these 110 cases was 2.7%. Colectomy was performed in 27.3% of the cases, while ileostomy was carried out in only one case. Among the patients who did not undergo surgery, most were able to return to their occupations.

9025 PRECANCEROUS EPITHELIAL DYSPLASIA IN ULCERATIVE COLITIS: HISTOLOGICAL POSSIBILITY OF EARLY DIAGNOSIS OF COLITIS CARCINOMA. (Ger.) Otto, H. F.; Gebbers, J. O. (Pathologisches Institut der Universitat Hamburg, Martinistrasse 52, D-2000 Hamburg, W. Germany). *Virchows Arch. [Pathol. Anat.]* 377(3):259-276; 1978.

The histology of rectal and colonoscopic biopsy specimens from 20 patients with longstanding colitis (4-22 yr) was studied to determine if precancerous changes are useful for detecting early cancer in colitis. Some patients were monitored by colonoscopy and biopsy for up to 7 yr. A histological study was conducted of rectal and colonoscopic biopsy specimens from 20 patients with colitis of 4- to 20-yr duration. Surgical specimens from a second group of 39 proctocolectomy patients with precancerous epithelial lesions were examined retrospectively; the duration between initial clinical symptoms and proctocolectomy was 3 to 9 yr. Premalignant changes were found in 12 rectal and 14 colonic biopsies from the 20 patients. In the retrospective study, only 3/39 patients were found to have had precancerous lesions. Histologically, the precancerous lesions found among the biopsies could be divided into atypical basal cell proliferation, light-celled epithelial dysplasia, epidermoid metaplasia with atypical cells, adenomatous dysplasia, and intermediate forms. Demonstration of severe epithelial dysplasia led to proctocolectomy in 7 of the 20 patients, with an interval of about 2 yr between discovery of dysplasia and surgery. Two of these patients had a carcinoma; the remaining patients were tumor-free. A progression of dysplasia forms could not be demonstrated in any individual, but epidermal metaplasia and atypical basal cell proliferation appeared relatively soon, after 6 and 8 yr of colitis, while adenomatous and villous dysplasia only appeared after a longer period of colitis. Adenocarcinoma always appeared with adenomatous or villous dysplasia, and never with atypical basal cell proliferation. These forms thus present grounds for proctocolectomy.

9026 ANTIBODIES TO SYNTHETIC POLYRIBONUCLEOTIDES IN SPOUSES OF PATIENTS WITH INFLAMMATORY BOWEL DISEASE. (Eng.) DeHoratius, R. J.; Miller, W. C.; Gaeke, R. F.; Strickland, R. G.; Volpicelli, N. A.; Kirsner, J. B.; *et al.* (Dept. Medicine, Univ. New Mexico, Albuquerque, NM 87131). *Lancet* 1(8074):1116-1119; 1978.

To investigate whether RNA viruses are involved in the etiology of inflammatory bowel diseases, sera of 28 patients with Crohn's disease; 16 patients with ulcerative colitis; normal age-, sex-, and race-matched controls; and the unaffected spouses of all subjects were examined for the presence of antibodies to synthetic polyribonucleotides. Significantly more synthetic single-stranded RNA (poly-rA) was bound by serum from patients (230 ng/ml) and from their spouses (185 ng/ml) than by serum from the controls (75 ng/ml, $p<0.002$) or the spouses of the controls (78 ng/ml, $p<0.01$). Similarly, significantly more synthetic double-stranded RNA (poly-rA-poly-rU) was bound by serum from the patients (501 ng/ml) and by serum from their spouses (468 ng/ml) than by serum from the controls (199 ng/ml, $p<0.002$) or by serum from the spouses of the controls (66 ng/ml, $p<0.02$). Binding of poly-rA-poly-rU was similar in patients with Crohn's disease and ulcerative colitis. Poly-rA binding was lower in the patients with ulcerative colitis but was still significantly higher ($p<0.05$) than in matched controls. Binding activity resided in immunoglobulin fractions and was predominantly of IgM class. A significant correlation was observed between the amount of double-stranded but not single-stranded RNA bound by serum from patients and from their respective spouses ($r=0.4$, $p<0.02$). These findings provide indirect support for the presence of RNA viruses in patients with inflammatory bowel diseases and the transmission of such agents to their close personal contacts.

9027 TEN YEARS EXPERIENCE WITH INTRAVENOUS HYPERALIMENTATION AND INFLAMMATORY BOWEL DISEASE. (Eng.) Mullen, J. L.; Hargrove, W. C.; Dudrick, S. J.; Fitts, W. T., Jr.; Rosato, E. F. (Hosp. Univ. Pennsylvania, 3400 Spruce St., Philadelphia, PA 19104). *Ann. Surg.* 187(3):523-529; 1978.

An analysis of parenteral nutritional support provided by i.v. hyperalimentation (IVH) to 74 patients with inflammatory bowel disease (IBD) durin 1967-1976 is presented. The patients, 24 with ulcerative colitis (UC) and 50 with granulomatous disease (GD) of the small bowel, colon, or combine disease of both, underwent 117 courses of IVH. Or admission for treatment, the patients were malnourished with a weight loss of more than 10% in 63 of them. The malnutrition was of the marasmic-kwashiorkor type with a marked depletion of body-cell mass (weight loss, 19 ± 3 pounds; serum albumin level, 2.9 ± 0.13%; serum transferase level 158 ± 13.2 mg%). Indications for parenteral nutritional support included nutritional preparatio for operation (33%), failure of medical treatment (61%), and the poor nutritional status of the patient (48%). Seventy-seven percent of the patien gained weight on IVH, averaging 10 pounds over th course of treatment (about 3.5 weeks). Almost 40 of the patients who had previously failed on medi cal regimen had an IVH-induced remission. Therap before IVH treatment was often of the multiple-drug variety, including steroids, 51%; salicylazo sulfapyridine, 51%; and opiates, 57%. After IVH, the amounts of these medications required were 35 20%, and 26%, resp. No mortality was attributed IVH, and complications arose from IVH in only eig patients. Seventeen of 43 enterocutaneous fistulas found in 25 patients were closed with IVH alone. As only three of these recurred, the over all closure rate with IVH alone was 33%. In the surgical ulcerative colitis patients, a correlati was noted between the occurrence of surgical complications and the absence of preoperative stero treatment. The 10-yr review shows that IVH can ameliorate malnutrition in IBD patients. Combine with complete bowel rest, it can be an effective primary treatment (particularly for GD) or an adjunct to the surgical management of the complications of IBD. Criteria for the use of IVH in IB are given, and it is noted that, since its effica has been documented, nutritional support can be offered to these patients at an earlier stage in the disease.

9028 FILIFORM POLYPOSIS. (Eng.) Zegel, H. G.; Laufer, I. (Hosp. Univ. Pennsylvan 3400 Spruce St., Philadelphia, PA 19104). *Radio ogy* 127(3):615-619; 1978.

The cases of four patients with filiform polypos are presented. This disease was associated with inflammatory bowel disease in three cases, but t fourth patient, a 77-yr-old man, had no prior history of inflammatory disease. The first pati was a 36-yr-old woman who had experienced an epi sode of ulcerative colitis 2 yr previously but h been in almost complete remission prior to follo up examination. At this time, a stricture of th transverse colon was found. A subtotal colectom with ileorectal anastomosis was performed. Path ological examination of the specimen confirmed the presence of a benign stricture and multiple inflammatory polyps, some of which had a long, thin filamentous structure. The second patient was a 20-yr-old woman with granulomatous colitis

had been asymptomatic for 4 yr, but a double
trast enema showed several long, filamentous
ling defects on a background of normal mucosa
the transverse and descending colon. No fur-
r diagnostic or therapeutic procedures were
icated. The third patient, a 33-yr-old man,
an 8-yr history of Crohn's disease involving
small bowel and rectum. He developed epigas-
c pain, dysphagia, and vomiting, and a double
trast gastroduodenal examination showed defor-
y of the antrum and pylorus with some loss of
cular folds in the proximal duodenum. There
extensive involvement of the distal duodenum
proximal jejunum by Crohn's disease. Num-
us, small filamentous filling defects were noted
the body of the stomach. Multiple biopsy
cimens showed that these lesions were composed
irely of normal gastric tissue. Biopsies around
margin of a gastric ulcer adjacent to the
troesophageal junction were compatible with
te gastritis but showed no evidence of granuloma
mation. The last patient presented with rectal
eding, and a filiform polyp of the distal colon
found. Biopsy showed acute and chronic mucosal
lammation, which could indicate either that un-
ognized ulcerative colitis or ischemic colitis
been present. It is important to recognize
iform polyposis as a benign, nonspecific se-
la of prior, severe inflammatory disease.

9 CORRELATION OF PLASMA ELECTROLYTES AND
FORM ELEMENTS. (Rus.) Revutskii, B.
(First Dept. Therapy, Donetsk Medical Inst.,
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0 ELECTROLYTE COMPOSITION OF THE BLOOD AND
SMALL INTESTINAL SECRETION IN PATIENTS
H CHRONIC ENTEROCOLITIS RECEIVING DIFFERENT
RAPY. (Rus.) Revutskii, B. I.; Linevskii, Iu.
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3 TREATMENT OF ULCERATIVE COLITIS WITH
ASTRONAUT FOOD. (Pol.) Bojanowicz, K.
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223 Lodz, Poland). *Pol. Tyg. Lek.* 32(30):1153-1155; 1977.

9034 USE OF DRY BIFIDUMBACTERIN IN COMPLEX TREATMENT OF CHRONIC INFLAMMATORY INFECTIONS OF THE LARGE INTESTINE. (Rus.) Yukhvidova, Zh. M.; Semenova, L. P.; Kuznetsova, G. C.; Grigoriev, G. A.; Goncharova, G. P. (Central Scientific Res. Inst. Gastroenterology, Moscow, USSR). *Sov. Med.* 2:104-109; 1977.

9035 PRELIMINARY CLINICAL EXPERIENCE WITH A NEW SALAZOSULFAPYRIDINE PREPARATION (COLO-PLEON®) IN THE TREATMENT OF ULCERATIVE COLITIS. (Ger.) Koch, H.; Belohlavek, D. (Medizinische Klinik mit Poliklinik der Universitat Erlangen-Nurnberg, Krankenhausstrasse 12, 8520 Erlangen, W. Germany). *Therapiewoche* 27(29):5331-5332; 1977.

9036 SURGICAL ASPECTS OF ULCERATIVE AND GRANULOMATOUS COLITIS. (Ger.) Stelzner, F. (Chirurgische Universitatsklinik, 53 Bonn-Venusberg, W. Germany). *Therapiewoche* 27(38):6691-6695, *passim;* 1977.

9037 ASSOCIATION OF ULCERATIVE COLITIS, COLONIC CARCINOMA, PLASMACYTOMA AND DERMATITIS HERPETIFORMIS (DUHRING'S DISEASE). (Ger.) Kovary, P. M.; Intorp, H. W.; Lonauer, G.; Losse, H. (Universitats-Hautklinik, V.-Esmarchstrasse 56, 4400 Munster, W. Germany). *Therapiewoche* 26(37):5668-5674, *passim;* 1976.

See also, 8625, 8973, 9231, 9260, 9262.

9038 LIPASE ACTIVITY IN BLOOD FOLLOWING ENDOSCOPIC PANCREATOGRAPHY: DEMONSTRATION OF ITS PANCREATIC ORIGIN AND EXISTENCE OF DUCTAL OR ACINO-VENOUS PATHWAYS IN MAN. (Eng.) Figarella, C.; De Caro, A.; Oi, I.; Sahel, J. (Unite de Recherches de Pathologie Digestive, U 31 Inserm 46, Chemin de la Gaye-13009 Marseille, France). *Scand. J. Gastroenterol.* 13(4):393-399; 1978.

The origin of serum lipolytic activity observed in patients undergoing endoscopic retrograde cholangiopancreatography (ERCP), whether or not followed by nephrography, was investigated. Immediately before and 30 min after cannulation of the Wirsung duct, serum lipase was obtained from 569 patients suspected of pancreatic or biliary disease and who underwent ERCP. The serum lipase properties were compared with those of pancreatic lipase isolated from pancreatic juice obtained by hormonal stimulation of 17 patients before ERCP. Both pancreatic and serum lipase were inhibited by biliary salts above their critical micellar concentrations; the inhibition was reversed by addition of colipase. Studies of serum and pancreatic lipase by chromatography on Sephadex G-100, by electrophoresis, and by double-diffusion immunological assays gave identical results, leading to the conclusion that the serum lipolytic activity in the patients after ERCP was undoubtedly of pancreatic origin. Studies of the patients by post-ERCP nephrography showed an increase in serum lipolytic activity immediately after cannulation of the pancreatic duct and hormonal stimulation and before injection of contrast medium. Activity increased after injection of the dye, leading to pancreatography followed by nephrography, then decreased slowly to a normal value at 40 hr after examination. The presence of pancreatic enzyme activity in serum and the concomitant visualization of the nephron after injection of contrast medium agree with results of previous animal experiments and suggest the presence of acino- or duct-venous pathways in man. In addition to hormonal stimulation, the presence of a tube into the Wirsung duct seems to be necessary to permit an eventual acino- or duct-venous passage. Speculating on the apparent lack of colipase in the serum of certain patients with lipolytic activity and noting that the increased levels of pancreatic enzymes in the ERCP cases are similar to those seen in cases of acute pancreatitis (10-40 times normal), the authors suggest that the estimation of pancreatic enzymes in the blood may be useful in the diagnosis of acute pancreatitis and that the catalytic assay of pancreatic lipase in the blood performed in the presence of an excess of colipase may be a useful test because of its simplicity and rapidity.

9039 BILE ACID METABOLISM IN CYSTIC FIBROSIS. (Eng.) Eklund, A.; Norman, A.; Strandvik, B. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 241-246; 1977.

Because cirrhosis and liver damage may occur without the usual liver function tests being abnormal, bile acid metabolism and urinary excretion of bile acids were studied in 15 patients (aged 11 months-18 yr) with cystic fibrosis; all of them had gastrointestinal symptoms and increased fecal fat despite pancreatic enzyme therapy, 14 had pulmonary symptoms, 1 had celiac disease, and 1 was recoverin from severe malnutrition due to anorexia nervosa. Liver function tests were normal in all but two patients who showed moderate increases in one or two parameters; BSP retention and/or i.v. galactose elimination were normal in all patients. Of the ad ministered amount of ^{14}C-cholic acid, 13-77% was excreted during the 4-day sampling period; 11-71% of the dose was excreted in the feces; 1-19% of th excreted amount was found in the urine with the pe centage increasing significantly with age (r=0.780 p<0.001). Total urinary bile acid excretion increased with age (from 1 to 27, μmol/day), most of which was due to other than primary bile acids; bi acid concentration (correlated to body weight and square meter body surface) increased in the same way. Bile acids were excreted as free acids (containing most of the trihydroxy bile acids), glycin or taurine conjugates, or sulfated conjugates (con taining almost all the monohydroxy bile acids). Despite normal liver function tests, the urinary excretion of isotope after ^{14}C-cholic acid administration increased with age in patients with cyst fibrosis. The urinary bile acid pattern in these patients corresponds to that found in healthy chil dren, but the concentration is higher.

9040 SUBCUTANEOUS CYTOSTEATONECROSIS OF PANCREATIC ORIGIN: SURGICAL PROBLEM IN 5 CASES. (Fre.) Mornet, P.; Guivarc'h, M.; Morin, M.; Marquand, J. (Centre medico-chirurgical Foch, 92151 Suresnes, France). *J. Chir. (Paris)* 114(6): 427-442; 1977.

Five patients with subcutaneous cytosteatonecrosis (Weber-Christian syndrome of pancreatic origin) are reported, and the 68 cases in the world literature are reviewed. The pancreatic pathology was pancreatitis in four patients, only one of whom was an alcoholic, and cancer of the pancreas in one. All five patients had subcutaneous nodule and inflammed painful finger or toe and other joi abdominal pain and weight loss were experienced b some patients. Elevated levels of amylase in blo and urine and elevated blood lipase level led to suspicion of pancreatic pathology. Abdominal barium transit x-rays showed enlarged duodenum with or without pancreatic calcification in three of f patients. Laparotomy revealed the presence of ca cer of the pancreas and hepatic metastases in one tient who had no subsequent treatment. Cystoduod stomy and duodenopancreatectomy, resp., were performed on two patients with excellent results. T remaining two patients, one of whom was the alcoh died with widespread cytosteatonecrosis despite c jejunostomy and cholecystostomy in the alcoholic and intensive medical treatment with corticosteroids, antienzymes, and aspiration in the other. It is concluded that recovery is possible if earl

cision of the affected portion of the pancreas or
pass surgery is performed.

)41 RUPTURED PANCREATIC PSEUDOCYSTS: DIAGNO-
SIS BY ENDOSCOPY. REPORT OF 3 CASES.
ng.) Bretholz, A.; Lammli, J.; Corrodi, P.; Knob-
uch, M. (Med. Univ.-Klinik, Ramistrasse 100,
-8091, Zurich, Switzerland). *Endoscopy* 10(1):
-23; 1978.

report of three cases of endoscopically proven
ontaneous perforation of a pancreatic pseudocyst
to the stomach is presented. A 37-yr-old man
th a noncontributory history, a 40-yr-old man
th a history of multiple bulbar and duodenal
cers, and a 35-yr-old alcoholic man with a his-
ry of acute pancreatitis all presented with acute
per gastrointestinal bleeding. The first pa-
ent, who was being treated with anticoagulants
r an acute calf-vein thrombosis, had a clinically
lent bout of acute pancreatitis (suspected be-
use of an elevation of the amylase level and
eated with parenteral nutrition and gastric as-
ration) with pseudocyst formation. Endoscopy
vealed a large circumscribed protrusion in the
sterior wall of the stomach with a hemorrhagic
cosa and giant mucosal folds in the corpus. A
cm-wide opening in the fundus developed, and
osed slightly over 2 months. The patient was
ing well at 1-yr follow-up. The second patient,
o had had caudal pancreatic resection for active
docrine adenomata, had perforation of a pancre-
ic pseudocyst 1 yr later. There was severe dif-
se erosive and hemorrhagic gastritis, perfora-
on of the retrogastric process, and a 4-cm open-
g into a pseudocyst filled with necrotic material.
e patient recovered with conservative treatment.
the third patient, bleeding recurred after 2
eks of conservative management, necessitating
parotomy. An 8-cm pseudocyst in the pancreatic
il and eroding the gastric wall was found. The
udal part of the pancreas and the proximal part
the stomach were resected and an end-to-end
ophago-antrostomy performed.

42 COMPUTED TOMOGRAPHY IN PANCREATIC DISEASE
[Abstract]. (Eng.) Fawcitt, R. A.;
herwood, I.; Braganza, J.; Howat, H. T. (Dept.
agnostic Radiology, Univ. Manchester, Manchester,
gland). *Br. J. Radiol.* 51(601):65; 1978.

43 ULTRASONIC INVESTIGATION OF THE PANCREAS
[Abstract]. (Eng.) Berger, L. A. (Royal
ee Hosp., London, England). *Br. J. Radiol.* 51
01):65; 1978.

44 CIMETIDINE IN TREATMENT OF PANCREATIC
INSUFFICIENCY [Letter to Editor]. (Eng.)
rro, G. B.; Dolcini, R.; Grossi, E.; Petrillo, M.;
ada, A. (Ospedale L. Sacco, Milan, Italy). *Lancet*
3043):878-879; 1977.

9045 GRANULOMA (SARCOID?) OF THE PANCREAS: A CASE REPORT. (Eng.) Caldwell, J. H.; Evans, W. E. (N-937 Univ. Hosp., Ohio State Univ., 410 W. 10th Ave., Columbus, OH 43210). *Am. J. Gastroenterol.* 69(3, Part 1):320-322; 1978.

9046 CARCINOMA OF THE PANCREAS OCCURRING IN A CHILD: A CASE REPORT WITH DESCRIPTION OF GRAY SCALE ULTRASOUND FINDINGS. (Eng.) Masterson, J. B.; Bowie, J. D.; Port, R. B.; Elahi, C. F.; Burrington, J. D.; Kranzler, J. (Univ. Chicago Hosp. and Clinics, 950 E. 59th St., Chicago, IL 60637). *J. Clin. Ultrasound.*6(3):189-190; 1978.

9047 MECONIUM ILEUS EQUIVALENT. (Eng.) Spiro, R. K.; Landman, M. E. (St. Vincent's Hosp., Montclair, NJ). *Am. J. Gastroenterol.* 69(3, Part 1):302-306; 1978.

9048 CARCINOMA OF THE PANCREAS. (Eng.) Scholz, F. J.; Hatfield, P. M.; Larsen, C. R.; Wise, R. E. (Lahey Clinic Foundation, Boston, MA). *Curr. Probl. Diagn. Radiol.* 7(5):1-41; 1978.

9049 ADENOACANTHOMA OF THE PANCREAS: REPORT OF FOUR CASES AND LITERATURE REVIEW. (Eng.) Weitzner, S. (Univ. Mississippi Medical Center, Jackson, MS 39216). *Am. Surg.* 44(4):206-209; 1978.

9050 CASE REPORT: COMPUTED TOMOGRAPHY OF CYSTADENOMA OF THE PANCREAS. (Eng.) deSantos, L. A.; Bernardino, M. E.; Paulus, D. D.; Martin, R. E. (Univ. Texas System Cancer Center, Houston, TX 77030). *J. Comput. Assist. Tomogr.* 2(2):222-225; 1978.

9051 IS SULPHATED BLOOD-GROUP SUBSTANCE IN PANCREAS A FACTOR IN CYSTIC FIBROSIS? (Eng.) Rolla, G.; Melsen, B.; Sonju, T. (Klinikk for Barnetandpleie og Kariesprofylakse, Geitmyrsveien 71, Oslo 4, Norway). *Acta Pathol. Microbiol. Scand.* [*A*] 86(1):83-86; 1978.

9052 VISCOSITY OF DUODENAL JUICE EXAMINED IN PATIENTS WITH EXCRETORY PANCREAS INSUFFICIENCY BY THE PANCREOCYMIN [sic] SECRETIN TEST COMPARED TO A CONTROL GROUP AND PATIENTS WITH CHOLELITHIASIS. (Eng.) Leonhardt, H.; Reinhardt, I. (Freie Universitat Berlin, Klinikum Steglitz, D-1000 Berlin 45, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(1):45-48; 1978.

See also, 8774, 8788, 8789, 8790, 8793, 8795, 8804, 8822, 8879, 8899, 8952, 9063, 9070, 9071, 9178, 9208, 9209, 9212, 9213, 9224, 9225, 9233.

Pancreatitis

9053 EFFECT OF PROLONGED ADMINISTRATION OF CORTICOSTEROIDS ON EXOCRINE PANCREATIC SECRETION IN MAN. (Fre.) Bourry, J.; Sarles, H. (INSERM U-31, 46, chemin de la Gaye, F 13009 Marseille, France). *Gastroenterol. Clin. Biol.* 2(2): 139-144; 1978.

Because treatment with corticosteroids causes acute pancreatitis in man, exocrine pancreatic secretion was analyzed before and after stimulation with secretin (1 clinical U [CU]/kg) and cholecystokinin-pancreozymin (CCK-PZ, 3 Crick-Harper-Raper U/kg) in 19 patients without pancreatic disease treated with corticosteroids for 46 days to 22 yr. The corticosteroids used in their treatment included betamethasone, triamcinolone, dexamethasone, methylprednisolone, prednisolone, prednisone, hydrocortisone, and tetracosactide. Pancreatic function was compared with that of a control group of 19 sex-, age-, and weight-matched patients without pancreatic disease or steroid treatment. The single sample of pancreatic excretion taken 15 min prior to injection of secretin and CCK-PZ and the two samples taken 15 min and 30 min afterwards were analyzed for lipase, chymotrypsin, phospholipase, bicarbonate, and calcium levels. The absolute concentration of lipase and chymotrypsin and the difference in their concentrations before and after pancreatic stimulation were all significantly ($p<0.05$-0.001) higher in the corticosteroid-treated patients. It is suggested that the hypersecretion of enzymatic proteins in pancreatic fluid of patients on corticosteroids may be the cause of pancreatic lesions.

9054 THE ACTIVITY OF PHOSPHOLIPASE A IN DUODENAL JUICE UNDER PANCREOZYMIN SECRETIN STIMULATION IN CHRONIC PANCREATITIS. (Eng.) Hashihira, S.; Saito, S.; Saeki, M.; Nishii, T.; Takeda, Y.; Mori, R.; *et al.* (Osaka Medical Coll., Takatsuki, Osaka, Japan). *Jpn. Arch. Int. Med.* 24(11): 397-404; 1977.

The cholecystokinin-pancreozymin (CCK-PZ) and secretin tests were carried out in 25 patients with pancreatitis and 18 controls to compare amylase secretion with phospholipase A (PLA) secretion. Eleven patients had calcifying pancreatitis, 5 had definite noncalcifying pancreatitis, and 9 were suspected of having noncalcifying pancreatitis. Controls and patients with pancreatitis showed maximal PLA output 10 min after pancreozymin (1 U/kg body weight, i.v.) stimulation and minimal levels at 40 and 60 min following secretin (1 U/kg body weight, i.v.) stimulation. Stimulated PLA output tended to be lower in the patients with pancreatitis than in the controls, and in the patients with calcifying pancreatitis, this difference was statistically significant ($p<0.05$, 70 min after pancreozymin-secretin stimulation). The amylase output displayed a similar tendency. Although individual deviations were sometimes seen, the total output of both enzymes showed a significant positive correlation ($r=0.837$, $p<0.01$). The PLA/amylase ratios in the patients with calcifying pancreatitis, definite noncalcifying pancreatitis, and suspected noncalcifying pancreatitis, (1.48 ± 0.04, 1.45 ± 0.03, and 1.44 ± 0.03) were significantly higher than those in the controls (1.35 ± 0.02, $p<0.05$). This suggests that PLA maintains its secretory function better than does amylase during pancreatitis.

9055 EARLY OR DELAYED OPERATION IN ACUTE HEMORRHAGIC-NECROTIZING PANCREATITIS? (Eng.) Neher, M.; Mangold, G.; Schonborn, H. (Chirurgische Klinik der Universitat Mainz, W. Germany). *Chir. Gastroenterol.* 11(2):249-252; 1977.

Survival was assessed in patients who underwent early and late operation for necrotizing pancreatitis. Of the 26 patients with acute pancreatitis who underwent early surgery (i.e., after the appearance of necrosis but before the beginning of mortally dangerous complications), 17 had only partial necrosis; 11/17 survived. Of the nine patients who underwent early surgery and had total necrosis, eight survived. Digital removal of necrotic tissue or left-sided resection was possible in the surviving patients. Twenty-three of 32 patients who underwent delayed operation (i.e., after the acute phase) survived. The techniques used were digital removal of sequestric tissue and left-sided resection. The authors conclude that the surgical treatment of total pancreatic necrosis should begin before the onset of lethal complicatio but that operation may be delayed for partial pancreatic necrosis, if there are no initial complications or there is no deterioration in the patient's clinical condition.

9056 ALTERATION OF SURFACTANT CHEMISTRY IN EXPERIMENTAL HEMORRHAGIC PANCREATITIS. (Eng.) Maciver, A. G.; Metcalfe, I. L.; Possmayer, F.; Harding, P. G. R.; Passi, R. B. (Univ. Hosp., 339 Windermere Rd., London, Ontario, N6A 5A5 Canada). *J. Surg. Res.* 23(5):311-314; 1977.

The hypothesis that the direct alveolar damage seen in acute pancreatitis may occur secondary to enzymatic degradation of pulmonary surfactant by pancreatic lecithinase was tested in dogs in which hemorrhagic pancreatitis was experimentally induced by transduodenal low pressure injection of autologous bile (0.5 ml/kg) into the main pancreatic duct. Experimental and sham-operated control animals were ventilated for 12 hr and then sacrificed. Saline lavage of the pulmonary alveoli was conducted, and the collected suspension was centrifuged. The lipid was extracted with chloroform; methanol and the phospholipids were separated and assayed by thin-layer chromatography. The total yield of phospholipid was significantly reduced in the experimental group (1.93 ± 0.23 mg/k

dy weight) in comparison with that in controls
.21 ± 0.24 mg/kg, $p<0.005$). The lysolecithin
action was significantly increased in the exper-
ental versus the control group (5.85 ± 0.32%
rsus 1.31 ± 0.16%, $p<0.001$). The minimum surface
tivity of a pulsating bubble in a suspension of
e extracted lung wash over 5 min was significantly
creased in the experimental dogs (22.4 ± 5.9
nes/cm) in comparison with that in controls (1.7
0.8 dynes/cm, $p<0.01$). These results demonstrate
at the recovery of surfactant is reduced and that
e percentage of lysolecithin is increased in
morrhagic pancreatitis, which supports the stated
pothesis.

57 PANCREATITIS FOLLOWING KIDNEY TRANSPLANTATION. (Ger.) Scholzel, E.; Largiader,
; Uhlschmid, G.; Binswanger, U.; Corrodi, P.;
oblauch, M. (Chirurgische Universitatsklinik A,
rich, Switzerland). *Schweiz. Med. Wochenschr.*
8(5):161-165; 1978.

ncreatitis following kidney transplant presents
serious, often life-threatening complication.
llow-up of 249 recipients of cadaver renal al-
grafts showed that 14 had contracted pancreatitis
week to 7 yr and 4 months following transplanta-
on. Five patients died as a direct result
the disease, while pancreatitis discovered
autopsy was implicated in the death of two
tients. The incidence of pancreatitis was 5.6%,
th a mortality rate of 50%; participation of
ncreatitis in death was 7%. Etiologic factors
this complication included pancreatic damage
used by chronic uremia before the transplant,
eatment with L-asparaginase, and damage from in-
ctions. Pancreatitis following kidney trans-
antation is thus thought to be of multifactorial
igin, with steroid therapy predominant in causing
ncreatic damage.

58 PANCREATITIS FOLLOWING SPINAL CORD INJURY. (Eng.) Carey, M. E.; Nance, F. C.; Kir-
s, H. D.; Young, H. F.; Megison, L. C., Jr.;
ine, D. G. (Louisiana State Univ. Medical Center,
42 Tulane Ave., New Orleans, LA 70112). *J. Neuro-
rg.* 47(6):917-922; 1977.

x cases of pancreatitis following spinal cord in-
ry in otherwise healthy individuals are reported.
ur patients manifested signs and symptoms of
ert pancreatitis having variously, fever, pro-
acted nausea, vomiting, or epigastric tenderness.
o patients died from the effects of grossly or
croscopically confirmed acute hemorrhagic pan-
eatitis. All patients had ileus because of their
rd lesion. None had hyperparathyroidism, amino-
iduria, hyperlipemia, hemochromatosis, or chole-
thiasis, and none was alcoholic. Only one pa-
ent may have sustained pancreatic trauma, and
ly one was hypothermic. The possibility of pene-
ating ulcer was excluded in four cases. None of
e patients had prolonged steroid therapy; one
ceived no steroids and another received only a
single 12-mg injection of dexamethasone. No single, etiologically accepted mechanism already postulated to cause pancreatitis can account for all the cases reported. The authors hypothesize that spinal cord disruption may produce pancreatitis by sympathetic-parasympathetic nervous system imbalance resulting in over-stimulation of the sphincter of Oddi. This may lead to stasis of secretions with absorption of amylase into the systemic circulation, and structural pancreatic damage. Pancreatitis in patients with cord injuries is easily overlooked because abdominal pain is usually absent and fever is usually attributed to more frequently occurring pulmonary or urinary tract infections. Recognition of this complication is important to decrease the morbidity and mortality mortality that follows spinal cord damage.

9059 ACUTE PANCREATITIS: THE QUEENSLAND SCENE. (Eng.) Battersby, C.; Chapuis, P. (Princess Alexandra Hosp., Ipswich Rd., Woolloongabba, Queensland 4102, Australia). *Aust. N.Z. J. Surg.* 47(2):204-209; 1977.

9060 IATROGENIC PANCREATITIS. (Eng.) Anonymous (No affiliation given). *Br. Med. J.* 2(6094):1043; 1977.

9061 PREDICTIVE VALUE OF BIOCHEMICAL INDEXES IN ACUTE ALCOHOLIC PANCREATITIS. (Eng.) Palani, C. K.; Sehgal, L. R.; Kraft, A. R.; Duarte, B.; Dulski, R.; Levine, H.; Moss, G. S. (Cook County Hosp., Chicago, IL). *Surg. Forum* 28:441-443; 1977.

9062 SPONTANEOUS DRAINAGE OF A PANCREATIC CYST WITHOUT REFILL. (Eng.) Raymond, S. W.; Hemphill, R. B. (West Suburban Hosp., Oak Park, IL). *Abdom. Surg.* 19(6):143-146; 1977.

9063 ENDOSCOPIC CANNULATION OF THE PAPILLA OF VATER. (Eng.) Cotton, P. B. (Middlesex Hosp., London W1, England). *Rend. Gastroenterol.* 9(2):144-149; 1977.

9064 NUTRITIONAL HABITS OF ACUTE PANCREATITIS PATIENTS IN VERONA, ITALY. (Eng.) Angelini, G.; Cavallini, G.; Vantini, I.; Rosa, B.; Adamo, S.; Zuniga, G.; *et al.* (Clinica Medica III, Universita di Padova, Sede di Verona, 37100 Verona, Italy). *Rend. Gastroenterol.* 9(2):114-117; 1977.

9065 ACUTE PANCREATITIS. (Fre.) Boutelier, Ph. (No affiliation given). *Chirurgie* 103(9):856-857; 1977.

9066 PANCREATITIS DUE TO OBSTRUCTION OF ODDI'S SPHINCTER. (Eng.) Mouiel, J.; Bourgeon, R.; Chauvin, P.; Bertrand, J. C.; Giaume, F.; Rey,

J. F. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 163-174; 1977.

9067 THE PART THAT THE SPHINCTER OF ODDI PLAYS IN THE ETIOLOGY OF PANCREATITIS. (Eng.) White, T. T. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 175-179; 1977.

9068 NEWER CONCEPT FOR THE PATHOGENESIS OF CHRONIC ALCOHOLIC PANCREATITIS. (Eng.) Bordalo, O.; Goncalves, D.; Noronha, M.; Cristina, M. L.; Salgadinho, A.; Dreiling, D. A. (Faculty Medicine, Lisbon, Portugal). *Am. J. Gastroenterol.* 68(3):278-285; 1977.

9069 PANCREATIC PLEUROPERICARDIAL EFFUSIONS PRESENTING AS TUMOR OF THE LUNG. (Eng.) Ploy-Song-Sang, Y.; Vassallo, C. L. (Univ. Cincinnati Medical Center, Room 7510, Medical Sciences Building, 231 Bethesda Ave., Cincinnati, OH 45267). *South. Med. J.* 70(12):1474-1476; 1977.

9070 CHRONIC PANCREATIC ASCITES AND PANCREATIC PLEURAL EFFUSIONS. (Eng.) Cameron, J. L. (Johns Hopkins Medical Inst., Baltimore, MD 21205). *Gastroenterology* 74(1):134-140; 1978.

9071 CHRONIC PANCREATITIS IN ITALY. AETIOLOGICAL, CLINICAL AND HISTOLOGICAL OBSERVATIONS BASED ON 253 CASES. (Eng.) Gullo, L.; Costa, P. L.; Labo, G. (Policlinico S. Orsola, Via Massarenti, 9, 40138 Bologna, Italy). *Rend. Gastroenterol.* 9(2): 97-104; 1977.

9072 INTERPRETATION OF AMYLASE CLEARANCE IN PATIENTS WITH ABNORMAL CREATININE CLEARANCE. (Eng.) Payne, R. B. (St. James' Univ. Hosp., Leeds LS9 7TF, England). *Br. Med. J.* 1(6104):22; 1978.

9073 PANCREATIC STIMULATION WITH GIH AND BOOTS SECRETIN IN NORMAL AND CHRONIC PANCREATITIC [sic] SUBJECTS. (Eng.) Bardella, M. T.; Terruzzi, V.; Ranzi, T.; Bianchi, P. A. (First Dept. Medicin Univ. Milan, Milan, Italy). *Panminerva Med.* 19(5) 295-298; 1977.

9074 SWEAT ELECTROLYTES IN CHRONIC PANCREATIT (Eng.) Bank, S.; Marks, I. N.; Novis, B (Long Island Jewish Hosp., New Hyde Park, NY). *Am. J. Dig. Dis.* 23(2):178-181; 1978.

9075 THE TIMING OF CHOLECYSTECTOMY IN PATIENT WITH GALLSTONE PANCREATITIS. (Eng.) Yague, S. (San Juan de la Cruz Hosp., Ubeda, Jaen, Spain). *Abdom. Surg.* 20(2):27-29; 1978.

9076 SYMPOSIUM ON PANCREATITIS: 1. CONSERVATIVE MANAGEMENT OF ACUTE PANCREATITIS. (Eng.) Keith, R. G. (Sunnybrook Medical Center, 2075 Bayview Ave., Toronto, Ontario M4N 3M5, Canada). *Can. J. Surg.* 21(1):56-58; 1978.

9077 SYMPOSIUM ON PANCREATITIS: 2. SURGICAL MANAGEMENT OF ACUTE PANCREATITIS. (Eng. Poncelet, P. (Centre Hospitalier de l'Universite Laval, 2705 boul. Laurier, Quebec G1V 4G2, Canada) *Can. J. Surg.* 21(1):58-59; 1978.

9078 SYMPOSIUM ON PANCREATITIS: 4. SURGERY IN CHRONIC PANCREATITIS. (Eng.) Turner F. W. (Dept. Surgery, Univ. Alberta, Edmonton, Alberta, Canada). *Can. J. Surg.* 21(1):63-67; 1978.

See also, 8704, 8780, 8907, 8916, 8952, 9040, 904 9043.

79 AUTOMATIC ANALYSIS OF BSP KINETICS IN
THE NORMAL INDIVIDUAL AND IN LIVER PA-
ENTS. (Ita.) Mattei, M.; Avanzolini, G.; Gnudi,
; Malaguti, P.; Sciarretta, G.; Ruscelli, C.;
al. (Ospedale Maggiore "C. A. Pizzardi,"
logna, Italy). *Minerva Dietol. Gastroenterol.*
(2):79-83; 1977.

gain greater clinical information from the BSP
imination test, injections of 5 mg/kg of BSP in
5% solution were given to 10 healthy individuals,
with nonhepatic digestive disease, 10 with
eatosis, 10 with cirrhosis, 9 with chronic ac-
ve hepatitis, 6 with granulomatous hepatopathy,
with cancer and cirrhosis, and 3 with metastases.
ood samples were taken at various time periods
nging from 4 to 120 min after the injection. The
tention of BSP after 45 min was 1.9 ± 0.5% in
e control group, 3.9 ± 2% in those with non-
patic digestive disease, 12.5 ± 6.6% in those
th steatosis, 24.6 ± 6.5% in those with cirrhosis,
.8 ± 8% in those with chronic active hepatitis,
5 ± 6.6% in those with granulomatous hepatopathy,
± 6% in those with cancer and cirrhosis, and 18 ±
.3% in those with metastases. A two-compartment
erum and liver) mathematical analysis of the
crease in BSP levels was made and the coeffi-
ents of exchange were determined. It is concluded
at the mathematical model is more discriminating
patients with hepatopathy than with other types
disease.

80 ELECTROMYOGRAPHY IN THE DETECTION OF
PERIPHERAL NEUROPATHY IN CHRONIC LIVER
SEASE. (Ita.) Alvisi, V.; Degli Uberti, E.;
alli, G. (Istituto di Patologia Speciale Medica
Metodologia Clinica, Universita degli Studi di
rrara, Ferrara, Italy). *Minerva Med.* 68(62):
83-4191; 1977.

ectromyographic studies were done on 29 patients
o had had hepatopathy for not less than 3 yr (dia-
tics and alcoholics were excluded). The neuro-
gic examination revealed neuropathy (paresthesia,
poesthesia, and osteotendinous hypo-areflexia)
9/29 patients. Among the 13 with chronic latent
patopathy, 4 showed neuropathy, while among the
with overt chronic hepatopathy, 5 had neuropathy.
e velocity of minimum motor conduction (VC MIN)
the ulnar nerve was significantly slower in
tients with chronic latent hepatopathy with
inical signs of neuropathy (47.7 m/sec, $p<0.05$)
an in healthy controls. In these patients,
th the VC MIN and the velocity of maximum con-
ction (VC MAX) for the external poplitic sciatic
rve were significantly slower (37.75 m/sec and
.875 m/sec, resp., $p<0.05$) than in the controls.
patients with overt chronic hepatopathy without
inical signs of neuropathy, the VC MAX (54.476
sec) and VC MIN (48.585 m/sec) of the ulnar nerve
re significantly lower ($p<0.01$) than in the con-
ols. In these patients the VC MAX (44.904 m/sec),
MIN 37.985 m/sec), and the dispersion (6.78 m/sec)
re all lower ($p<0.001$) than in the controls. In
tients with overt chronic hepatopathy showing
inical signs of neuropathy, the VC MIN (46.20
m/sec) and the VC MAX (53.34 m/sec) were significantly lower in the ulnar nerve ($p<0.01$) and the VC MAX (43.06 m/sec), the VC MIN (33.966 m/sec), and the dispersion (8.8 m/sec) were significantly lower ($p<0.001$) for the external poplitic sciatic nerve. The results confirm that in cases of chronic hepatopathy neuropathy can develop.

9081 SKIN REACTIONS CAUSED BY VITAMIN K IN PATIENTS WITH LIVER DISEASE. (Eng.)
Bullen, A. W.; Miller, J. P.; Cunliffe, W. J.; Losowsky, M. S. (St. James' Hosp., Leeds LS9 7TF, England). *Br. J. Dermatol.* 98(5):561-565; 1978.

Six cases are reported in which patients with chronic liver disease developed cutaneous reactions around the site of injection of oil-soluble vitamin K. The erythematous rash appeared at the injection site 7-16 days after the initiation of vitamin K therapy for a raised prothrombin time. In four patients, the rash spread, either towards the sacrum or more frequently, down to the thigh. Resolution occurred with scaling with 9-22 days. The amount of vitamin K given before the onset of the rash varied between 270 and 440 mg. Five patients subsequently received a water-soluble vitamin K analogue with no adverse affects. In two patients skin tested by the intradermal injection of 0.1 ml of the vitamin K preparation within 1 week of the development of the rash, induration and erythema occurred. This reaction was maximal at 24-72 hr. Pruritus occurred at the site of injection from 24 hr to 15 days after the skin test. There was no significant skin reaction in these two patients when menadiol sodium diphosphate or the different components of the oil-soluble preparation of vitamin K were injected. Similar results were obtained in three other patients tested several months after the development of the initial reaction. Lymphocyte transformation was not stimulated by up to 200 µg/ml of the preparation, nor was leukocyte migration inhibited by 500 µg/ml in the one patient tested. Skin biopsy of the lesion showed a nonspecific perivascular infiltration with chronic inflammatory cells in the dermis. Staining for IgG, IgA, IgM, IgE, and the C_3 component of complement gave negative results. Skin testing was also carried out in 10 other patients with chronic liver disease, none of whom had developed a skin reaction to i.m. vitamin, and in 10 healthy controls. Four patients with liver disease and two healthy volunteers developed a reaction to intradermal vitamin K (0.1 ml). The pathogenesis of this reaction remains uncertain, but the authors suggest that large doses of vitamin K are implicated, and that the reaction may not be immunologically determined.

9082 DOES FATTY LIVER INDUCED BY PARENTERAL NUTRITION DEPEND ON THE AMOUNT OF GLUCOSE SUPPLIED? (Fre.) Messing, B.; Bitoun, A.; Galian, A.; Mary, J. Y.; Goll, A.; Bernier, J. J. (Hopital Saint-Lazare, 107 bis, rue du Faubourg-Saint-Denis, F 75010 Paris, France). *Gastroenterol. Clin. Biol.* 1(12):1015-1025; 1977.

A retrospective study of 15 patients fed parenterally for 7-500 days with high protein (0.20-0.55 g N/kg/24 hr) and variable glucose (40-100 kcal/kg/24 hr) showed 4 patients who definitely developed fatty liver and 5 suspected cases. Criteria for selection of the patients for study were (1) absence of hyperlipemia prior to parenteral feeding (triglycerides ≤1.50 g/l, total cholesterol ≤2.60 g/l), (2) absence of evidence of liver disease, (3) absence of diabetes, (4) precisely defined nutrition, and (5) weekly evaluation of liver function and blood lipids. The nine patients with confirmed or suspected fatty liver received significantly ($p<0.015$) higher levels of glucose (68.89 ± 6.05 kcal/kg/24 hr) than did the other six patients (45.83 ± 3.52 kcal/kg/24 hr). In addition, these nine patients had hypertriglyceridemia (1.60-7.60 g/l) with an average increase in triglycerides of 3.27 ± 0.69 g/l compared with an increase of 0.37 ± 0.07 g/l ($p<0.005$) in the six patients without fatty liver. The presence of fatty liver was determined by biopsy and by measurement of the levels of transaminases and alkaline phosphatase; hepatomegaly developed in five patients and icterus in two. It is concluded that glucose should not be excessive in parenteral nutrition, and when necessary to supply caloric needs, fatty acids should be substituted.

9083 HEPATIC HEMANGIOMAS: PITFALLS IN SCINTIGRAPHIC DETECTION.

(Eng.) Good, L. I.; Alavi, A.; Trotman, B. W.; Oleaga, J. A.; Eymontt, M. J. (Hosp. Univ. Pennsylvania, 3600 Spruce St., Philadelphia, PA 19104). *Gastroenterology* 74(4): 752-758; 1978.

Recent experiences with three patients with angiographically proven hepatic hemangiomas that were not always detected by radionuclide blood flow and blood pool scintigrams of the liver are presented. In the first patient, hepatomegaly associated with a large solitary scintigraphic defect of the liver was present. A rapid-sequence flow study after the i.v. injection of 15 mCi of ^{99m}Tc-pertechnetate revealed no flow to the large defect during the 1 min that images were obtained. Ultrasound examination revealed an inhomogeneous echo pattern in the right half of the liver, which suggested a large solid intrahepatic mass. A liver biopsy produced hepatic bleeding, and at laparotomy an extensive cavernous hemangioma was found. Postoperatively, a hepatic arteriogram revealed a massive cavernous hemangioma involving the entire liver. At a second laparotomy, the right hepatic artery was ligated; 1 yr later, a blood pool image revealed a pattern consistent with a hemangioma. The second patient had hepatomegaly with a scintigraphic space-occupying mass in the right lobe. A rapid-sequence flow study revealed no appreciable uptake of the radionuclide in the defect, and a blood pool image showed a smaller defect in the same location, suggesting vascularity in the periphery of the lesion. Hepatic angiography showed a large hemangioma in the right lobe and many other small ones scattered throughout both lobes. The third patient did not have an enlarged liver, but liver scans revealed a solitary defect in the right lobe. On hepatic blood flow and blood pool scans, this lesion appeared to have less activity than did the surrounding hepatic parenchyma. A hepatic arteriogram revealed a solitary circumscribed hemangioma in the posterior aspect of the right lobe. On the basis of this experience, the authors recommend hepatic angiography for definitive evaluation of the vascularity of solitary defects found on routine liver scans.

9084 LYSOSOMAL DISRUPTION IN THE PATHOGENESIS OF HEPATIC DAMAGE IN PRIMARY AND SECONDARY HAEMOCHROMATOSIS.

(Eng.) Peters, T. J.; Selden, C.; Seymour, C. A. (Royal Postgraduate Medica Sch., London, England). *CIBA Found. Symp.* 51(New Series):317-329; 1977.

Evidence that lysosomes accumulate iron in the liver cells of patients with hemochromatosis and that this accumulation is implicated in the pathogenesis of the tissue damage is reviewed. Morphology of liver, spleen, myocardium, bone marrow cells, and enterocytes from patients with iron overload demonstrated prominent lysosomes, presumed to contain iron compounds. The activities of two lysosomal enzymes, acid phosphatase and *N*-acetyl-β-glucosaminidase, were significantly elevated in liver biopsies from patients with primary or secondary hemochromatosis, which was consistent with the intralysosomal accumulation of iron. Subcellular fractionation by sucrose density gradient centrifugation of liver biopsy specimens from a patient undergoing venesection for hemochromatosis showed that at least 85% of both *N*-acetyl-β-gluco minidase and β-galactosidase activities were present as nonsedimentable enzyme remaining in the sample layer. After venesection, the iron conten was about one-third of that in untreated tissue but was still six times greater than that of control tissue. About half the enzyme activity remained in the sample layer, while the remainder was associated with lysosomes. However, the density distribution of the lysosomes was strikingly abnormal, with an equilibrium density of 1.29 compared with 1.20 in control tissue. These high density lysosomes had a unique enzyme composition containing significant amounts of *N*-acetyl-β-glucosaminidase and β-galactosidase activity but relatively little acid phosphatase and β-glucuron dase activity. Biopsy extracts after further venesection showed normal tissue iron concentrations and normal acid hydrolase distribution. Electron microscopy of tissue before treatment showed distended hemosiderin-containing lysosomes Iron-laden lysosomes have also been observed in iron-overloaded rats. Increased activities of acid hydrolases and enhanced lysosomal fragility in liver homogenates have been demonstrated in pa tients but not in experimental animals.

9085 GENETICALLY DETERMINED IMMUNE HYPERREACTIVITY IN HUMAN LIVER DISEASE.

(E Eddleston, A. L. W. F. (King's Coll. Hosp., Londo SE5, England). *Proc. R. Soc. Med.* 70(8):525-529; 1977.

idence suggesting that there is an inherited mune hyper-reactivity in many patients with chron- active hepatitis (CAH) is reviewed. Family udies have shown that many of the first-degree latives of patients with hepatitis B surface tigen (HBsAg)-negative CAH have raised serum mma-globulin levels in the absence of any clin- al or biochemical signs of liver disease; this compelling evidence against the hypothesis that e hypergamma-globulinemia in these patients is tirely secondary to liver damage. In addition, er 60% of these patients have been found to pos- ss the same histocompatibility antigen, HLA-B8. patients with HLA-B8 and HBsAg-negative CAH, e mean titers of antibodies to rubella, measles, ooth muscle, nuclei, and *Escherichia coli* have en found to be higher than in patients without e histocompatibility antigen; in the case of bella antibodies, the difference is significant. ong relatives of all these patients with chronic patitis, the mean titer of rubella antibodies was und to be significantly higher in the first- gree relatives than in the genetically-unrelated ouses, but these high antibody levels were not lated to the presence of HLA-B8. This is evi- nce against the proposed simple inheritance of immune-response gene linked to HLA-B8, but is nsistent with the inheritance of a more general- ed nonspecific increase in immune responsiveness at is under polygenic control. One author has ggested that a defect in the activity of suppres- r T cells may be of central importance in the rsistence of autoimmune reactions and thus the thogenesis of autoimmune tissue injury. The esent author has postulated that HLA-B8 might be marker for such an abnormality in the control of mune responses and that this defect could be the nk between the many different HLA-B8 associated seases. A suppressor T-cell defect would result a failure to switch off immune responses ade- ately, but only when combined with a powerful itch-on mechanism would it lead to very high tibody levels. The parallelism between this pre- cted behavior and the actual findings in patients th CAH and their relatives is remarkably close.

86 SECONDARY HYPERTRIGLYCERIDAEMIA IN PATIENTS WITH PARENCHYMAL LIVER DISEASE. (Eng.)

ose, G.; Windelband, J.; Weizel, A.; Greten, H. linisches Institut fur Herzinfarktforschung an der dizinischen Universitatsklinik, Bergheimer Strasse , D-69 Heidelberg, W. Germany). *Eur. J. Clin. vest.* 7(6):557-562; 1977.

e role of hepatic triglyceride lipase (H-TGL) and asma lipoprotein lipase (LPL) in liver diseases s studied by selective precipitation of H-TGL with ecific antibodies and subsequent measurement of th activities. The subjects included 50 patients th acute hepatitis, 20 patients with chronic tive or persistent hepatitis, 50 patients with ver cirrhosis, and 47 healthy volunteers. All zyme activities are in units of log μmol x 100 ee fatty acids released 1 ml/hr. The mean H-TGL tivity in the 22 normal men was 38.94 ± 4.54, and at in the 25 normal women was 36.66 ± 5.94. The mean levels in the 26 women with acute hepatitis (30.91 ± 8.64, $p<0.05$), the 24 men with acute hepatitis (31.06 ± 20.0, $p<0.05$), the 14 women with chronic hepatitis (29.90 ± 18.80, $p<0.05$), the 13 women with liver cirrhosis (28.40 ± 19.0, $p<0.01$), and the 37 men with liver cirrhosis (29.0 ± 13.8, $p<0.01$) were significantly lower than the corresponding values in the normal men and women. The mean LPL level in women with acute hepatitis (27.40 ± 18.5) was significantly lower ($p<0.01$) than the LPL levels in normal men or women (34.36 ± 4.44 and 32.27 ± 4.55, resp.), but all other levels were similar to the control levels. The possibility of a circulating inhibitor in the patient's serum was ruled out by mixing enzyme preparations from normal controls with plasma from liver patients. Both H-TGL and LPL were not inhibited with increasing amounts of such serum in the incubation medium. The LPL level did not correlate significantly with any liver function test. There were significant correlations between H-TGL activity and the levels of plasma triglycerides ($r=0.3002$, $p<0.05$), alkaline phosphatase ($r=0.4350$, $p<0.01$), and lecithin-cholesterol-acyltransferase (LCAT, ($r=0.2994$, $p<0.05$) in acute hepatitis; between H-TGL activity and SGPT level ($r=0.4836$, $p<0.05$) and between H-TGL and SGOT level ($r=0.4521$, $p<0.05$) in chronic hepatitis; and between H-TGL activity and serum bilirubin level ($r=0.4463$, $p<0.01$), between H-TGL activity and the normotest ($r=0.5966$, $p<0.01$), and between H-TGL and LCAT activities ($r=0.5965$, $p<0.01$) in liver cirrhosis. Total post-heparin lipolytic activity decreased with the severity of liver dysfunction. With improvement, hypertriglyceridemia disappeared with a concomitant increase in the H-TGL and LPL levels. It is concluded that impaired triglyceride metabolism in liver disease is at least partly caused by diminished plasma hepatic TGL activity.

9087 SONOGRAPHY AND CONVENTIONAL RADIOGRAPHY FOR POSTOPERATIVE LOCAL INFECTIONS IN THE UPPER ABDOMEN. (Ger.)

Vogel, H.; Scherer, K.; Eckert, P.; Vogel-Karl, B. (Radiologische Klinik, Universitatskrankenhaus Hamburg-Eppendorf, 2000 Hamburg 20, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(5):433-439; 1977.

Sonographic and conventional radiographic examinations were performed on 24 patients with suspected postoperative abscesses and/or empyemas of the upper abdomen. Total or partial pancreatectomy was performed in 5 cases, Billroth I antireflux plastic surgery and other interventions in the upper digestive tract in 12, surgery on the hepatobiliary system in 5, and combined surgery in 2. Thirty-two abscesses and empyemas were subsequently diagnosed by puncture and reoperation. Sonography demonstrated all 8 liver abscesses, 11/21 abdominal empyemas, and 3 abscesses or empyemas in other positions. Radiography demonstrated 5/8 liver abscesses, 16/21 upper abdominal empyemas, and 1 of the remaining lesions. Sonography demonstrated fluid-filled cavities, while radiography showed especially the presence of extraluminal air. The two methods are consequently complementary. Sonography should be the first diagnostic method used whenever postoperative liver abscess is suspected, while radiography should precede sonography in case of suspected postoperative empyema.

9088 HEPATIC FINDINGS IN JUVENILE CHRONIC POLYARTHRITIS. (Ger.) Rau, R. (Stadtspital Triemli, CH-8063 Zurich, Switzerland). *Schweiz. Med. Wochenschr.* 107(35):1235-1237; 1977.

Hepatic findings in patients with juvenile chronic polyarthritis (JCP) and Chauffard's syndrome (CS) are reviewed. Hepatomegaly was found in 2.9% of patients with JCP as strictly defined, in 48% of the patients with incomplete CS, and in 79% of the patients with complete CS. This hepatomegaly increased during recurrences, and disappeared during remissions. Transient jaundice, elevation of amino transferase levels, and delayed BSP excretion were reported, particularly in patients with complete CS; these findings are indicative of impaired liver function. Liver biopsies have been performed only rarely; they demonstrated nonspecific lymphocyte infiltration of portal fields and, in a few cases, autoimmune hepatitis and even liver cirrhosis with portal hypertension. Plasma cell hepatitis with arthropathy can be easily differentiated from juvenile rheumatoid arthritis: in the former, the synovitis is merely transient and disappears under steroid therapy. As in adults, severe liver dysfunction leads to remission of arthritis. Amyloidosis should be considered in every case of long-lasting hepatomegaly.

9089 IMMUNOGLOBULINS IN SERA OF PATIENTS WITH PORPHYRIA CUTANEA TARDA. (Eng.) Kordac, V.; Fucikova, T. (Charles Univ. Prague, Dept. Clinical Immunology, Unemocnice 2, 12808 Praha 2, Czechoslovakia). *Acta Hepatogastroenterol. (Stuttg.)* 25(1):20-22; 1978.

The serum immunoglobulins were investigated in 67 patients with porphyria cutanea tarda (PCT) and compared with those in 163 healthy controls and 37 age- and sex-matched controls. The typical laboratory findings of PCT were confirmed in these patients (increased BSP retention and SGPT level, positive thymol turbidity reaction). IgG and IgM levels were significantly lower in PCT patients without liver cirrhosis (both those not treated, the S group, and those treated with venepunctures, the V group) than in the controls. The IgG and IgM levels were 150 and 175 IU, resp., in controls, 125 IU ($p<0.05$) and 138 IU ($p<0.01$), resp., in the S group, and 142 IU ($p<0.01$) and 163 IU ($p<0.01$), resp., in the V group. The IgA levels in all patients and the IgG and IgM levels in the untreated PCT patients with cirrhosis were not significantly different from control values. The authors suggest that some PCT patients may have an altered humoral immunity.

9090 ERYTHROPOIETIC PROTOPORPHYRIA: JUVENILE PROTOPORPHYRIN HEPATOPATHY CIRRHOSIS AND DEATH. (Eng.) Cripps, D. J.; Gilbert, L. A.; Goldfarb, S. S. (Univ. Wisconsin Sch. Medicine, 1300 University Ave., Madison, WI 53706). *J. Pediatr.* 91(5):744-748; 1977.

The case of an 11-yr-old boy with erythropoietic protoporphyria complicated by severe hepatic cirrhosis and failure is described. The patient had a 10-yr history of photosensitivity. He presented with jaundice, fever, acute dermatitis, edema, and tiredness. Hepatosplenomegaly, ascites, and periumbilical vein distention were present. The patient subsequently developed a gastric ulcer with perforation, and liver function deteriorated. Episodes of hematemesis, due to esophageal varices, occurred, and the patient died. The terminal eryt rocyte protoporphyrin values were 8,650 to 9,650 μg/dl. Stool protoporphyrin was 1,580 μg/g dry weight, and the estimated level in the liver was 57.5 mg/g wet weight. At autopsy, the liver showe typical features of postnecrotic cirrhosis, was greatly enlarged (1,700 g), and distorted by numerous hyperplastic nodules. Masson trichrome stain indicated dense fibrous scars separating hepatocellular nodules. The hyperplastic nodules contained hepatocytes and Kupffer cells containing clumps of brown pigment. When examined by fluorescence microscopy with a quartz iodine tungsten light, the clumps emitted a persisting red fluorescence, and when examined under polarized light, appeared birefringent with prominent Maltese-cross patterns. Ultrastructural examination showed distinct aggregates of crystalline structures. They were composed of short, straight, or slightly curv barlike structures with tapered ends. Lymph nodes in the region of the porta hepatis and around the head of the pancreas contained abundant doubly refractile pigment similar to that of the liver parenchyma. Although severe liver damage in erythropoietic protoporphyria is rare, patients with this disease should be followed regularly with liver function tests, and a liver biopsy at the time of initial diagnosis may be considered.

9091 FERRITIN IN HUMAN LIVER CELLS OF HOMOZYGOUS BETA-THALASSAEMIA: ULTRASTRUCTURAL OBSERVATIONS. (Eng.) Iancu, T. C.; Neustein, H. (Lady Davis Carmel Hosp., Haifa, Israel). *Br. J. Haematol.* 37(4):527-535; 1977.

Iron overload was studied ultrastructurally in 16 biopsy specimens from 10 patients, of whom 9 had homozygous beta-thalassemia and 1 had delta-beta-thalassemia. A number of round or oval lysosomal structures containing lamellae different from myelin figures were seen in all patients, including those with minimal iron overload. Ferritin molecules were seen either forming arrays in relation with the lamellae, or in paracrystalline arrangement, or with no organized form. There were practically no ferritin molecules in subcellular compartments other than cell sap and lysosomes. The concentration of randomly dispersed ferritin molecules in the cell sap of hepatocytes in the three patients under 13 months of age was noticeably lower than that in older patients; the mean number of ferritin particles in the former patients were 0.7, 0.5, and 0.1 particles/cm^2. In patients over

yr of age and up to 22 yr, the cell sap counts
re 4.1-10.6 particles/cm^2, and the counts were
related to age. Hemosiderin was found only
lysosomes and had various densities. Hemo-
derin-containing lysosomes often contained lipid
oplets and/or myelin figures. Compared to hepa-
cytes, the Kupffer cells had a higher concentra-
on of ferritin in the cell sap, the number rang-
g between 20.8 to 30.6/cm^2 in patients older than
yr. In younger patients, the number of particles
s generally lower, but were variable from cell to
ll. Kupffer cells also showed a large number of
on-containing lysosomes. These observations re-
al that ferritin molecules vary in dimension,
rangement, distribution, and aggregation within
bcellular compartments in prolonged iron over-
ad. The round or oval structures in the lyso-
mes are thought to be early secondary lysosomes.
is study shows that the liver cells have a re-
rkably effective defense mechanism against iron
erload, which consists in the possibility of
eping a constant cell sap ferritin plateau by
ntinuous transport of excessive iron into lyso-
mes.

92 ISOLATED LESIONS OF THE PORTA HEPATIS IN
NONPENETRATING TRAUMA OF THE ABDOMEN:
TERIOGRAPHIC DATA. (Fre.) Malvy, P.; Le Neel,
C.; Leborgne, J.; Bourdon, J.; Mitard, D.
otel-Dieu de Nantes, 44035 Nantes Cedex, France).
irurgie 103(7):507-517; 1977.

ree patients with traumatic injuries to the porta
patis due to auto accidents, all of whom were
bjected to arteriographic study, are discussed.
51-yr-old man entered the hospital with multiple
auma including fractures. He was conscious, and
s blood pressure was normal at time of admission,
t he went into severe shock 3 hr later. At
ergency surgery, hemorrhagic peritonitis due to
dissection of the porta hepatis and a wound of the
patic artery was found; the artery was repaired.
follow-up 1-yr selective opacification of the
patic artery showed good vascularization of the
ver. A 48-yr-old man who entered the hospital
shock underwent exploratory surgery. Hemorrhagic
ritonitis was present. A ruptured spleen was
moved. A tear in the hepatic artery was not re-
irable, and the wounded section of the artery was
cised and the two sections linked. However, the
ver failed to regain normal color after the proce-
re. Arteriography performed several days after
rgery revealed a tear in the common hepatic artery
at had not been observed at surgery. The patient
ccumbed to an infection before further surgery
uld be performed. A 37-yr-old man entered the
spital in shock, which improved after blood trans-
sion. On the 5th day of hospitalization, a pro-
essive icterus appeared, and liver function studies
owed a slight increase in amylase, SGOT, and SGPT
tivities. Arteriography showed no anomalies of
e splenic or hepatic arteries; however, flow in
e gastroduodenal artery was interrupted. Surgery
s performed and bile was observed in the peritoneal
uid. A tear in the gallbladder was found as well
a healed wound of the gastroduodenal artery. A
olecystectomy was performed with a choledoschojejuna
anastomosis. The patient recovered and left the hospital 2 months after the accident. Lesions of the porta hepatis are rare, particularly in the absence of associated hepatic damage.

9093 TOXICOLOGY OF COPPER. (Eng.) Hill, C. H. *In: Advances in Modern Toxicology: Toxicology of Trace Elements.* (New York: John Wiley & Sons): 2:123-127; 1977.

Copper toxicology in humans and animals is reviewed. As this metal is encountered in nature, its toxicity is relatively low except in two special circumstances: humans with Wilson's disease are especially sensitive to copper and sheep can be afflicted with copper toxicosis under practical husbandry practices. Ingested copper is absorbed from the stomach and upper small intestine, passes into the blood where it is probably bound to albumin, and passes to the liver. The liver concentrates the copper first in the cytosol, then in the mitochondria, and finally in the nuclei. It reappears in the plasma in the form of ceruloplasmin. The major excretory pathway is via the bile. In Wilson's disease, the liver, kidneys, brain, and cornea accumulate large amounts of copper. Domestic animals, particularly sheep, are more likely to sustain copper toxicosis than are humans, because of copper-containing salt licks and deliberate copper feeding. Sheep poisoning is characterized by the gradual hepatic accumulation of copper over several weeks or months with no outward symptoms, followed by hemolysis, hemoglobinemia, and hemoglobinuria accompanied by the development of jaundice; these occur coincident with the release of copper from the liver. Calves are less sensitive to copper poisoning and only develop symptoms after ingesting 10-fold more copper than required to poison sheep. Copper toxicosis in swine may be related to an induced deficiency of zinc and iron, since these elements have been shown to prevent the jaundice, elevated aspartate transaminase levels, and anemia seen in pigs fed 750 ppm copper. Rats are apparently insensitive to copper poisoning. It appears that copper toxicosis is not a major problem: in humans, the ingestion of excessive copper salts leads immediately to vomiting, whereas animals have a great capacity to store copper in the liver.

9094 CLINICAL DIAGNOSIS OF HEPATOCELLULAR CARCINOMA. (Eng.) Okuda, K.; Kubo, Y. (Chiba Univ. Sch. Medicine, Chiba, 280, Japan). *Kurume Med. J.* 24(Suppl.):S81-S112; 1977.

Clinical features significant for the diagnosis of hepatocellular carcinoma (HCC) and the value of alpha-fetoprotein (AFP) determination and of celiac angiography in diagnosing this disease are presented. Abdominal fullness and distention were early symptoms in 44% of 134 patients with HCC, and abdominal pain occurred in 41.8%. Other symptoms were similar to those in liver cirrhosis. In one patient, a firm mass was felt in the right upper quadrant beside a normal liver edge; at autopsy, the lobe was found to be completely replaced by tumor. In other patients, localization of the tumor is difficult because of displacement of other organs, such as the spleen. Laboratory studies that are important in the diagnosis include alkaline phosphatase, SGOT, and SGPT levels; the SGOT/SGPT ratio; and LDH and AFP levels. The SGOT/SGPT ratio increases gradually during the advancement from chronic liver disease to cirrhosis and from cirrhosis to HCC; the ratio increases sharply during the weeks before death. The authors' own experience as well as the results of previous studies suggest that the AFP level is not always a reliable indicator of HCC. Liver sciniscan is regarded as one of the most reliable diagnostic tools in liver cancer. However, HCC arising in a cirrhotic liver is not readily detected by this method alone. The use of ^{99}Tc-labeled colloid is superior to that of ^{198}Au-colloid in this situation, and the right lateral, posterior, left lateral, and anterior positions should all be used. HCC can sometimes be differentiated from metastatic carcinoma because the parenchyma surrounding the tumor in HCC has low activity, and the defect is not very discrete. Celiac and hepatic angiography often disclose small lesions that have escaped detection by scanning; the former techniques also provide information on the gross form of the tumor. One of the most characteristic angiographic findings in HCC is the presence of arterio-portal shunts. The smallest lesion detected by angiography in the authors' experience was 4 x 4 cm. The authors suggest that three other types of HCC should be recognized (cirrhotic, cholestatic, and hepatitis) aside from the five previously presented in the literature (frank, occult, febrile, acute abdominal, and metastatic).

9095 CELL-MEDIATED CYTOTOXICITY AGAINST HUMAN LIVER LIPOPROTEIN IN LIVER DISEASE [Abstract]. (Eng.) Vogten, A. J. M.; Shorter, R. G.; Summerskill, W. H. J. (State Univ. Hosp., Utrecht, Netherlands). *Digestion* 16(4):319-320; 1977.

9096 CATABOLISM OF Clq AND C3 IN CHRONIC LIVER DISEASE [Abstract]. (Eng.) Potter, B. J.; Elias, E.; Thomas, H. C.; Sherlock, S. (Royal Free Hosp., Hampstead, London, England). *Digestion* 16(4):356; 1977.

9097 ACUTE FATTY LIVER OF PREGNANCY WITH SURVIVAL OF MOTHER AND CHILD: A CASE REPORT. (Eng.) Ylostalo, P.; Jouppila, P.; Rasanen, O.; Hynynen, T. (Dept. Obstetrics and Gynecology, Univ. Oulu, 90220 Oulu 22, Finland). *Eur. J. Obstet. Gynecol.* 7(6):351-356; 1977.

9098 HEPATIC TUMORS, SURGICAL TREATMENT AND ITS RESULTS. (Eng.) Lin, T. Y. (Natl. Taiwan Univ. Hosp., Taipei, Taiwan, Republic of China). *Jpn. J. Surg.* 7(4):189-198; 1977.

9099 RISKS OF CORTICOSTEROID THERAPY IN LIVER DISEASE. (Eng.) Tytgat, G. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47) 46-49; 1977.

9100 RISKS OF LIVER BIOPSY. (Eng.) Renger, F. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):26-27; 1977.

9101 SPONTANEOUS RUPTURE OF A HEPATOMA. (Eng.) Singh, S.; Dhall, J. C.; Lal, M. M.; Sekhon, G. S. (Medical Coll. Hosp., 100 Doctors Hostel, Rohtak, Haryana, India). *Int. Surg.* 63(1): 45-46; 1978.

9102 FAMILIAL HBsAg-POSITIVE HEPATOMA: TREATMENT WITH ORTHOTOPIC LIVER TRANSPLANTATION AND SPECIFIC IMMUNOGLOBULIN. (Eng.) Johnson, P. J.; Wansbrough-Jones, M. H.; Portmann, B.; Eddleston, A. L. W. F.; Williams, R.; Maycock, W. D'A.; Calne, R. Y. (King's Coll. Hosp. and Medical Sch., London SE5, England). *Br. Med. J.* 1(6107): 216; 1978.

9103 HEPATIC DYSFUNCTION IN CONGESTIVE HEART FAILURE SIMULATING HEPATITIS. (Eng.) Field, R. S.; Meyer, G. W. (U.S. Air Force Medical Center, Keesler Air Force Base, MS 39534). *South. Med. J.* 71(2):221-222; 1978.

9104 URINARY TOTAL CATECHOLAMINES IN PREGNANT FEMALES WITH BILHARZIAL HEPATIC FIBROSIS. (Eng.) Abdel Aziz, M. T.; Abdel Kader, M. M.; Talaat, M.; Abdel Hamid, H.; El Fiki, A. F.; El Massry, A. A.; Gobba, S. A. (Faculty Medicine, Kasr El-Ainy St., UAR-Kairo, Egypt). *Dtsch. Gesundheitsw.* 33(4):185-186; 1978.

9105 "VASCULAR" BENIGN LIVER CYST IN CHILDREN: REPORT OF TWO CASES. (Eng.) Rosch, J.; Mayer, B. S.; Campbell, J. R.; Campbell, T. J. (Univ. Oregon Health Sciences Center, 3181 S.W. Sam Jackson Park Rd., Portland, OR 97201). *Radiology* 126(3):747-750; 1978.

9106 NEW CELLS FOR OLD. (Eng.) Anonymous. (No affiliation given). *Lancet* 1(8056): 133-134; 1978.

9107 HEPATIC GLYCOGEN SYNTHETASE DEFICIENCY: DEFINITION OF SYNDROME FROM METABOLIC AND ENZYME STUDIES ON A 9-YEAR-OLD GIRL. (Eng.) Aynsley-Green, A.; Williamson, D. H.; Gitzelmann, R. (John Radcliffe Hosp., Headington, Oxford OX3 9DU, England). *Arch. Dis. Child.* 52(7):573-579; 1977.

9108 TUBERCULOUS LIVER ABSCESS. (Eng.) Rab, S. M.; Zakaullah Beg, M. (Jinnah Postgraduate Medical Center, Karachi 35, Pakistan). *Br. J. Clin. Prcct.* 31(10):157-158; 1977.

) CASE REPORT: PELIOSIS HEPATIS IN A CHILD. (Eng.) Bank, J. I.; Lykkebo, Hagerstrand, I. (Odense Univ. Hosp., Odense, ark). *Acta Paediatr. Scand.* 67(1):105-107; .

) ANGIOGRAPHY OF THE REGENERATING LIVER AFTER LOBAR RESECTION. (Eng.) Karp, Tylen, U. (Univ. Hosp., S-221 85 Lund, Sweden). *Radiol. [Diagn.] (Stock.)* 18(5):571-580; .

NECROTIC LIVER CELL ADENOMA--A RARE CAUSE OF THE ACUTE SURGICAL ABDOMEN. .) Fogler, R.; Weiner, E.; Lanter, B. (No iliation given). *Abdom. Surg.* 20(1):11-13; .

2 MANAGEMENT OF INFERIOR VENA CAVAL INJURY IN LIVER TRAUMA. (Eng.) McMaster, P.; ley, M. (Addenbrooke's Hosp., Cambridge, Eng- d). *J. R. Coll. Surg. Engl.* 59(6):502-506; 1977.

3 PREOPERATIVE AND POSTOPERATIVE CARE. (Eng.) Stone, H. H. (Emory Univ. Sch. Medicine, 69 Butler St., Atlanta, GA 30303). *Surg. Clin. North Am.* 57(2):409-419; 1977.

9114 GRAY SCALE ECHOGRAPHIC PATTERNS OF HEPATIC METASTATIC DISEASE. (Eng.) Scheible, W.; Gosink, B. B.; Leopold, G. R. (Univ. California Medical Center, 225 W. Dickinson St., San Diego, CA 92103). *Am. J. Roentgenol.* 129(6):983-987; 1977.

9115 CYSTS AND BENIGN TUMORS OF THE LIVER. (Eng.) Walt, A. J. (Wayne State Univ. Sch. Medicine, Detroit, MI). *Surg. Clin. North Am.* 57(2):449-464; 1977.

See also, 8713, 8781, 8783, 8784, 8786, 8791, 8792, 8793, 8794, 8809, 8820, 8926, 8972, 9042, 9129, 9131, 9132, 9134, 9141, 9152, 9154, 9161, 9171, 9172, 9176, 9195, 9217, 9224, 9245, 9246, 9248, 9251.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

6 CHANGES OF SERUM GONADOTROPIN CONCENTRATIONS IN PREMATURE BABIES SUBMITTED TO OTOTHERAPY. (Eng.) Lemaitre, B.; Toubas, P. L.; llot, M.; Dreux, C.; Relier, J. P. (Hopital St.- is, rue de la Grange-aux-Belles, F-75010, Paris, nce). *Biol. Neonate* 32(3/4):113-118; 1977.

determine whether phototherapy affects plasma adotropin levels, follicle stimulating hormone H) and luteinizing hormone (LH) levels were ermined in eight premature infants who were ated for 2-8 days for hyperbilirubinemia and pared with those in six premature untreated in- ts without jaundice. In the four girls sub- ted to phototherapy, there were significant in- ases in plasma FSH ($p<0.001$) and LH ($p<0.01$) levels during the 3rd and 4th weeks after birth compared with levels in the 1st and 2nd weeks. FSH and LH levels also increased significantly during the 3rd and 4th weeks after birth in the treated newborn girls compared with the levels in controls (FSH $p<0.02$, LH $p<0.05$). In boys who underwent phototherapy, only the LH levels increased during the 3rd and 4th weeks. In both sexes, the rise in gonadotropin levels appeared between 8 and 10 days after the end of phototherapy. No significant changes in gonadotropin levels were observed in any of the controls. Constant phototherapy and/or the sudden stopping of the treatment in the jaundiced premature female newborn is responsible for a marked and transient elevation of gonadotropin.

Nonviral Hepatitis and Hepatic Injury

LIVER AND BILIARY TRACT

17 METHOXYFLURANE HEPATITIS. (Eng.) Min, K. W.; Cain, G. D.; Sabel, J. S.; Gyorkey, F. (Veterans Admin. Hosp., Houston, TX 77211). *South. Med. J.* 70(11):1363-1364; 1977.

A case of fulminant hepatitis due to repeated sniffing of methoxyflurane as a euphoriant is presented. The patient, a 42-yr-old man, presented with nausea, vomiting, icterus, pyrexia, lethargy, and vague, intermittent midabdominal pain. He had a history of heavy alcohol use but had consumed no alcohol for the last 3 yr. He admitted sniffing methoxyflurane for the last 2 months. The patient died in hepatic failure due to submassive hepatic necrosis 3 weeks after hospitalization. Fluorinated anesthetics should be considered as a causative agent in cases of fulminant hepatitis, especially in patients who have easy access to such drugs.

9118 POLYURIC RENAL FAILURE AND HEPATITIS ASSOCIATED WITH METHOXYFLURANE ANESTHESIA. (Eng.) Kalkay, N. M. (Brooklyn-Cumberland Medical Center, Brooklyn, NY). *N.Y. State J. Med.* 77(14):2265-2269; 1977.

A case is presented in which both of the toxic effects of methoxyflurane (hepato- and nephrotoxicity) occurred concurrently, and it is compared with similar cases from the literature. A 62-yr-old man underwent two episodes of retinal surgery 4 weeks apart in which methoxyflurane anesthesia was used. Renal injury manifested immediately: on the day of the second surgery, the patient developed a fever of 100.4 F that lasted 3 days, complained of weakness, dizziness, and excessive thirst, and was noted to have dehydration and orthostatic hypotension. Acute polyuric renal failure lasted 31 days. Hepatic injury began 12 days after the second surgery, manifested by low-grade fever, enlarged and tender liver, elevated transaminase level, and prolonged prothrombin time; it persisted 16 days. The hospital course was complicated by pericarditis, severe hypocalcemia, fluid and electrolytes imbalance, tachyarrhythmia, hypoalbuminemia, hypoprothrombinemia, and anemia. Peritoneal dialysis for azotemia and pericardial involvement was required intermittently for 2 weeks, and liver biopsy could not be done. Prior renal or hepatic disease, other toxic medications, blood transfusion, and shock were ruled out etiologically, and viral hepatitis appeared unlikely. Only four other proved cases of this type with sufficient data are known in the literature. Two different pathogenetic mechanisms appear to be at work. The nature of the renal disease seems to be predominantly tubular, perhaps induced by the direct toxic effects of fluoride. The injury is transient, dose-related, can be produced in experimental animals, and is not induced by halothane. The hepatic injury appears to be induced by an immunologic hypersensitivity reaction, has an unpredictable outcome with a very high mortality rate (perhaps 58%), cannot be produced in experimental animals, and is induced by halothane. Even the safest anesthetic agents are not free of severe side-effects.

9119 HEPATITIS DUE TO PERHEXILINE MALEATE: DEVELOPMENT OF CIRRHOSIS AFTER INTERRUPTION OF DRUG IN TWO CASES. (Fre.) Beaugrand, M.; Chousterman, M.; Callard, P.; Camilleri, J. P.; Petite, J. P.; Ferrier, J. P. (Hopital Jean-Verdier, avenue du 14-Juillet, F 93140 Boudy, France). *Gastroenterol. Clin. Biol.* 1(10):745-750; 1977.

Two cases are reported of liver damage in patients who were chronic users of the drug perhexiline maleate (Pexid). A 66-yr-old man had taken Pexid (200 mg/day for 23 months) to relieve pain associated with a myocardial infarction. He was hospitalized for vomiting and weight loss; his liver was hard and enlarged; and liver function studies and other laboratory tests showed abnormal liver function. Histological examination of the liver revealed sclerosis, inflammatory cell infiltration, and Mallory bodies in specimens of the centrilobular portion. Pexid was discontinued, and the patient was discharged from the hospital without signs of improvement in liver function tests. One month later he was rehospitalized with edema of the lower limbs, icterus, and hepatic encephalopathy, and he died within 2 weeks. A 53-yr-old man used Pexid (300 mg/day for 9 months) together with two other drugs for anginal pain. He was hospitalized for hepatomegaly and weight loss; liver function studies showed elevation of SGOT and SGPT levels and prolonged BSP retention. Mallory bodies and fatty degeneration were observed on microscopic examination of liver biopsies. Pexid was discontinued, and the patient was treated with prednisone. Liver function returned to normal, and histological examination revealed reduced inflammation, micronodular cirrhosis, but no Mallory bodies or hepatocytic lesions 6 months later. Both cases mimicked alcoholic hepatitis initially. The first patient had no history of alcohol consumption, whereas the second consumed no more than half a liter per day.

9120 TOXIC HEPATOSIS DUE TO SALICYLATES IN CHILDREN. (Ger.) Hinkel, G. K.; Korth, G.; Lorenz, K. (Kinderklinik, Medizinische Akademie "Carl Gustav Carus," Fetscherstr. 74, DDR-8019 Dresden, E. Germany). *Dtsch. Gesundheitswes.* 32(35) 1642-1644; 1977.

Three children treated with high doses of the salicylate Micristin (104-150 mg/kg/day) developed toxic hepatosis, which was also confirmed bioptically in one case. The clinical symptoms were mild, but the serum transaminase level was increased considerably in all cases. After normalization of the serum transaminase level, the Micristin therapy was continued at reduced dose (65 mg/kg/day) in one patient without any sign of intolerance. The findings indicate that toxic hepatosis due to high doses of salicylates occurs more frequently than has been assumed before and that the salicylate dose should be limited to 70 mg/kg/day. The serum transaminase level should be controlled regularly during salicylate therapy. Following the resolution of salicylate hepatitis, the salicylate therapy may be resumed after an interval but at a reduced dosage.

CHRONIC HEPATIC INFLAMMATION AND FIBROSIS
DUE TO LOW DOSES OF PARACETAMOL. (Eng.)
owsky, H. L.; Mudge, G. H.; McMurtry, R. J.
erans Admin. Center, White River Junction, VT
01). *Lancet* 1(8072):1016-1018; 1978.

case of a patient in whom liver injury developed
r chronic ingestion of paracetamol in thera-
ic doses is presented. Chronic hepatic necrosis
loped in a 53-yr-old man who had been taking 4
paracetamol daily for about 1 yr (cumulative
1,700 g). Liver biopsy done 23 days after the
was stopped showed prominent diffuse central
osis and portal changes. Repeat biopsy 5
hs later showed chronic active hepatitis. This
pted anti-inflammatory treatment, with subse-
t improvement in liver histology. Liver con-
rations of reduced glutathione and paracetamol
bolism were assessed 1-1.5 yr after the drug
stopped and were normal; the basis for this
ent's drug sensitivity is thus unclear. In
patients, chronic ingestion of therapeutic
s of paracetamol may produce hepatic necrosis
hepatitis that persist long after the drug has
discontinued.

2 HALOTHANE HEPATITIS IN CHILDREN [Letter to
Editor]. (Eng.) Crowe, G. R. (Struan
se, Cnr Brimage St. and Wood Terrace, Whyalla,
South Australia 5600, Australia). *Med. J. Aust.* 1(21):794; 1977.

9123 THE EFFECT OF ACETYLATION (AC) STATUS ON CHOLESTASIS AND HEPATOCELLULAR DAMAGE (HCD) IN ISONIAZID (INH) INDUCED LIVER DISEASE [Abstract]. (Eng.) Dickinson, D. S.; Hirschowitz, B. I.; Bailey, W. C.; Gibson, R.; Hodgkin, M. M. (Univ. Alabama Sch. Medicine, Birmingham, AL). *Gastroenterology* 72(5, Part 2):1049; 1977.

9124 FIRST CASES OF PYRROLIZIDINE ALKALOID POISONING IN THE UNITED STATES [Abstract]. (Eng.) Huxtable, R.; Stillman, A.; Ciaramitaro, D. (Univ. Arizona Health Science Center, Tucson, AZ 85724). *Pharmacologist* 19(2):181; 1977.

See also, 9184.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

5 DIFFERENCES IN THE BIOCHEMICAL COURSE OF
HBsAg-NEGATIVE AND HBsAg-POSITIVE HEPATITIS
IS. (Ger.) Strohm, W. D.; Hossenfelder, E.;
lle, W. (Zentrum der Inneren Medizin, Universitat
odor-Stern-Kai 7, D-6000 Frankfurt/Main 70, W.
many). *Z. Gastroenterol.* 16(1):13-23; 1978.

omparison of 73 hepatitis B surface antigen
sAg)-negative patients with 94 HBsAg-positive
ients, all of whom had been free of other dis-
es that could influence the course of hepatitis
or to contracting the disease, was carried out
determine whether the course of the disease
fered in these two groups. SGOT, SGPT, and
irubin levels were higher in HBsAg-positive
ients than in HBsAg-negative patients, and these
els remained higher for a longer time in the
mer group. During the acute stage, 56% of HBsAg-
itive patients had an initial increase in trans-
nase activity, generally with an increase in
de Ritis quotient (SGOT:SGPT), and 15% of the
ients reached a transaminase activity plateau;
y 22% of the HBsAg-positive patients had a
course similar to that of the HBsAg-negative patients. The median duration of the initial transaminase plateau in patients with hepatitis B was 17.9 ± 7.2 days; the duration of HBsAg-positive hepatitis was longer than that of HBsAg-negative hepatitis by more than 10 days. However, the duration of the disease in HBsAg-negative patients was appreciably longer in patients with transaminase recidivism with an increase in bilirubin. In HBsAg-negative patients, SGOT and SGPT values began to decrease immediately following the development of icterus. Laboratory determinations in the first days after the development of icterus were essentially the same in both types. The different biochemical behavior of HBsAg-negative and HBsAg-positive hepatitis may be due to differing immumological reactions of the liver.

9126 HISTOCHEMICAL DEMONSTRATION OF HBsAg IN LIVER BIOPSIES WITH ORCEIN STAINING.

(Ita.) Esposito, R.; Pollavini, G.; Randone, G.; De Lalla, F. (Istituto di Malattie Infettive dell'Universita di Milano, Milano, Italy). *Boll. Ist. Sieroter. Milan* 56(4):316-320; 1977.

The histochemical detection of hepatitis B surface antigen (HBsAg) was demonstrated using orcein stain. Liver biopsies were obtained from 30 HBsAg-seronegative and 33 HBsAg-seropositive individuals (5 were normal and 58 had liver diseases). The tissues were stained according to the modifications of Deodhar. In none of the HBsAg seronegative cases was positive staining obtained with orcein. Of the 33 HBsAg seropositive cases, 18 had hepatocytes whose cytoplasm was stained red-brown: 4/7 from patients with chronic persistent hepatitis, 5/9 from patients with chronic aggressive hepatitis, 6/11 from patients with chronic aggressive hepatitis with cirrhosis, and 3/6 from HBsAg-positive individuals without identifiable liver disease.

9127 SCANNING ELECTRON MICROSCOPY OF THE BILE DUCTULE. (Eng.) Itoshima, T.; Yoshino, K.; Yamamoto, K.; Ohta, W.; Kubota, M.; Ukida, M.; *et al.* (Okayama Univ. Medical Sch., Okayama, 700, Japan). *Gastroenterol. Jpn.* 12(6):476-482; 1977.

Scanning electron microscopy was used to study the bile ductule in a liver needle biopsy specimen from a 29-yr-old man in the convalescent stage of acute hepatitis, the onset of which had occurred 6 months earlier. The sinusoids, Disse spaces, portal triad vessels, tissue spaces, and bile ductule, which were all cleaned by puncture perfusion, were clearly demonstrated. The air crackings tended to occur between the cells and disclosed the intercellular surfaces. The ductule, portal triad, and portal vein branch were 13, 120, and 50 μm in outer diameter, resp. The ductule had sinusoids at the lobule side and tissue spaces and a 7-μm capillary at the portal side. The antiluminal border of the ductule was rather smooth and devoid of microvilli. The ductular lumen was surrounded by two ductular cells (each 18 μm in length), was 1.6-2.7 μm in diameter, and was ampullary dilated (2.7 μm in diameter) at the canalicular side. The canalicular-ductular junction was not evident. Intracytoplasmic diverticula with 0.9-μm diameter orifices were present in the lumen. Microvilli (0.4-0.6 μm long and 0.1 μm thick) were present on the luminal surface of the ductular cell (about 1,500/cell), being denser at the marginal flap and in the diverticula. A single cilium (0.15 μm wide at the base, 0.10 μm wide at the trunk, and 7-15 μm long) arose from a recess at the canalicular side of the ductular cell, and the free end was on the bile duct side. The distance from the luminal to the antiluminal side of the intercellular surface of the ductular cell was 5-6 μm. The outer area of the intercellular surface was undulated but without interdigitation. Occasionally, a cell with thin processes was intercalated between the ductular cells at the edge of the basal portion. The ductular cell surfaces corresponding to the intercalated cell were smoothly depressed and formed a canal 3 μm in diameter parallel to the long axis of the ductule.

9128 CHANGES IN AMINOPHENAZONE METABOLISM IN CHILDREN WITH ACUTE HEPATITIS. (Ger.) Windorfer, A., Jr.; Muller, G.; Stehr, C. (Kinderklinik und Poliklinik, Technische Universitat, Kolner Platz 1, 8000 Munich 40, W. Germany). *Dtsch. Med. Wochenschr.* 102(41):1460-1464; 1977.

The serum concentrations of aminophenazone (AP) were measured in 23 3- to 13-yr-old children with acute viral hepatitis and in 23 age-matched controls with normal livers following the administration of single doses of AP (8-22 mg/kg p.o.), as well as in 5 healthy young adults who received 8-17 mg/kg p.o. of AP. The control children received AP for acute attacks of fever. The serum half-life of AP was 2.85 ± 0.89 hr in the adult controls, 2.79 ± 0.53 hr in the control children, and 6.71 ± 3.34 hr in the children with hepatitis; the difference between the patients and controls was statistically significant ($p<0.1$). The serum AP concentration was highest 2 hr after administration, being somewhat higher in the control children than in the patients with hepatitis, but the difference was not significant due to the wide scatter of the data. The serum half-life of AP increased with increasing SGPT level ($r=0.9$) in the patients, but there was no correlation between the half-life and the dose in either control group. The maximum serum concentration of AP correlated with the dose in the control children ($r=0.84$), but only a weak correlation was seen in the patients ($r=0.38$). The findings indicate the interference of hepatopathy with AP metabolism.

9129 CLINICAL SIGNIFICANCE OF e-ANTIGEN/ANTI-e, WITH SPECIAL REFERENCE TO HBc-ANTIGEN IN THE LIVER. (Eng.) Furuta, S.; Kiyosawa, K.; Nagata, A.; Koike, Y.; Sahara, T.; Furukawa, K.; *et al.* (Dept. Internal Medicine, Shinshu Univ., Matsumoto, 3-1-1, Nagano-prefecture, 390 Japan). *Gastroenterol. Jpn.* 12(6):460-465; 1977.

The prevalence of hepatitis B e antigen (HBeAg), antibody to HBeAg (anti-HBe), and HB core antigen (HBcAg) was evaluated in 34 asymptomatic HB surface Ag (HBsAg) carriers, 8 patients with acute hepatitis, 16 with chronic persistent hepatitis, 36 with chronic active hepatitis, 35 with cirrhosis, and 23 with hepatoma, all of whom were HBsAg-positive. The frequency of HBeAg in these patient groups was 38.2, 25.0, 12.5, 33.3, 5.7, and 0%, resp., and of anti-HBe was 23.6, 50.0, 56.2, 61.1, 80.0, and 78.3%, resp. Among 22 asymptomatic HBsAg carriers, HBcAg was detected in the liver of 4/8 with HBeAg in the serum, 2/9 with anti-HBe in the serum, and 2/5 with neither HBeAg nor anti-HBe in the serum. Among 48 patients with chronic liver diseases, HBcAg was detected in the liver of 4/5 with HBeAg in the serum, 1/5 with anti-HBe in the serum, and 23/38 with neither HBeAg nor anti-HBe in the serum. The serum titer of antibody to HBcAg (anti-HBc) was lower in sera positive for anti-HBe than in sera positive for HBeAg ($p<0.05$), indicating that there may be a decreased level of HB virus replication in patients with anti-HBe. The results emphasize that the investigation of HBeAg and anti-HBe is mandatory for the evaluation of the prognosis of asymptomatic HBsAg carriers and of patients with chronic hepatitis.

9130 BEHAVIOR AND CLINICAL SIGNIFICANCE OF THE eAg/anti-e SYSTEM IN HBsAg CARRIERS.

(Ita.) Pastore, G.; Dentico, P.; Fera, G.; Angarano, G.; Schiraldi, O. (Istituto di Malattie Infettive dell'Universita di Bari, Bari, Italy). *Boll. Ist. Sieroter. Milan.* 56(4):333-338; 1977.

The relationship between hepatitis B e antigen (HBeAg), antibody to HBeAg (anti-HBe), and various forms of liver pathology caused by HB virus (HBV) was studied. Radioimmunoassay and radial immunodiffusion were used to determine HB surface Ag (HBsAg), antibody to HBsAg (anti-HBs), HBeAg, and anti-HBe levels in sera from 315 patients (154 with acute hepatitis, 44 HBsAg-positive asymptomatic subjects, and 117 with chronic hepatitis) drawn weekly during the period of recovery and at less frequent intervals during outpatient follow-up. For those with acute hepatitis, 31/82 who were cured had HBeAg in their sera during the acute phase, 8/82 had anti-HBe in their sera at this time, and all were positive for HBsAg. Six months later, none were positive for HBsAg, 50 had anti-HBs, 2 had HBeAg in their sera, and 25 had anti-HBe antibodies. Of the patients with protracted cases of acute hepatitis, 20/20 had HBsAg, 13/20 had HBeAg, and none had anti-HBe or anti-HBs in their sera during the acute phase. Six months later, 12/20 still had HBsAg, 2/20 had anti-HBs, 8/20 had HBeAg, and none had anti-HBe antibodies. Of the 52 HBsAg-negative patients with acute hepatitis, none were positive for HBeAg or anti-HBe. Of the 117 patients with chronic hepatitis, 28 had neither HBsAg, anti-HBs, HBeAg, nor anti-HBe. Of the 30/117 with chronic persistent hepatitis, 19/30 were HBsAg-positive (10/19 also had HBeAg, and 6/19 also had anti-HBe); 4/30 were anti-HBs-positive (2/4 also had HBeAg, and 1/4 also had anti-HBe). In the 30/117 with chronic aggressive hepatitis type A, 20/30 were HBsAg-positive (17/20 also had HBeAg, and 2/20 also had anti-HBe); 6/30 were anti-HBs-positive (3/6 also had HBeAg, and none had anti-HBe). Of the 9/117 with chronic aggressive hepatitis type B, 7/9 were HBsAg-positive (all also had HBeAg, and none had anti-HBe); 1/9 had anti-HBs and HBeAg but not anti-HBe. Of the 48/117 with cirrhosis, 22/48 were HBsAg-positive (9/22 also had HBeAg, and 1/22 also had anti-HBe); 10/48 were anti-HBs-positive (2/10 also had HBeAg but none had anti-HBe). Among the 44 HBsAg-positive but asymptomatic patients, only one, who was diagnosed as having chronic aggressive hepatitis, was HBeAg-positive, but 24 (17 with a history of acute hepatitis) had anti-HBe. The results confirm an association between HBV infection and the presence of HBeAg and anti-HBe in the serum.

9131 PRESENCE OF SERUM CREATINE KINASE ISOENZYMES IN LIVER FAILURE WITH CEREBRAL INVOLVEMENT.

(Eng.) Lemberg, A.; Werber, D. H.; Gilardoni, A.; Magrino, H. J. (Sch. Pharmacy and Biochemistry, Buenos Aires Univ., Buenos Aires, Argentina). *Clin. Chim. Acta* 80(2):385-390; 1977.

The presence of creatine kinase of the type that is derived from brain cells (BB-CK) in patients with severe encephalopathy and coma is reported. Twelve patients with clinical and biochemical evidence of hepatic failure, one diabetic with hyperglycemia and acidosis, and one with meningococcus purulent meningitis were studied. BB-CK was detected in the sera of all four patients with liver coma due to acute viral hepatitis. BB-CK occurred in three of four patients with cirrhosis and coma but in neither of two patients with chronic active hepatitis and coma. BB-CK was not detected in the sera of any of the remaining patients, all of whom also had severe encephalopathy. Only one patient with acute hepatitis survived, and in this patient the BB-CK disappeared. The enzyme was absent before the onset of encephalopathy in one patient with cirrhosis, but appeared when her condition deteriorated to grade IV coma. The concentrations of the enzyme ranged from 45 to 306 U/l in the patients with acute hepatitis and from 11 to 71 U/l in the patients with chronic liver disease. It seems clear that patients in this study can be divided into three groups: those with acute viral hepatitis, who show high BB-CK content in the serum; those with cirrhosis and chronic active hepatitis, who had either low serum BB-CK levels or none; and those with secondary liver involvement or with no liver involvement but with a severe general condition, in whom no BB-CK is found. Measuring CK isoenzymes in patients with severe liver pathology may help to measure the severity of the disease state.

9132 MODIFICATIONS OF FACTOR VIII RELATED ANTIGEN IN HEMOPHILIACS WITH ACUTE HEPATITIS AND SUB-CLINICAL LIVER DISEASE.

(Eng.) Sultan, Y.; Maisonneuve, P.; Simeon, J.; Intrator, L. (Hopital Saint-Louis 2, Place du Dr. A. Fournier 75475, Paris Cedex 10, France). *Scand. J. Haematol.* (Suppl. 30):16-26; 1977.

Modifications in factor VIII-related antigen (FFRA) were investigated in three patients with hemophilia during the course of post-transfusion hepatitis. The patients were among 36 multitransfused hemophiliacs in whom the mean FFRA level was 148.5% of normal. The level in the 10 hemophiliacs with a normal SGPT level was 112.4% of normal, while that in the 26 hemophiliacs with elevated SGPT levels was 163.2% of the normal level. In the first patient, the FFRA level was 300% of normal 4 days after the onset of jaundice and reached 620% on the 18th day. At that time the bilirubin level was 14.0 mg/100 ml, and the SGPT level was 165 U. The ristocetin cofactor was 280% (less than half the FFRA level). By the 32nd day, the SGPT and bilirubin levels were normal, and the FFRA level was near the normal range, although hepatitis B surface antigenemia persisted. Two-dimensional immunoelectrophoresis of the plasma on the 18th day showed abnormal results. FFRA appeared to be composed of two populations of FFRA molecules with different electrophoretic mobilities; this finding was confirmed by filtration of the cryoprecipitate on Sepharose 4B. The ability of the eluted protein to induce ristocetin aggregation in a washed platelet system was significantly reduced compared with the concentration of antigenic material. The FFRA level at the onset of disease in the second patient was 240% without modification of the procoagulant activity. The clinical symptoms rapidly resolved, and the liver function tests returned to normal. The FFRA gradually normalized. Immunodiffusion of FFRA during the acute phase showed a normal pattern. The third patient had a prolonged course of anicteric hepatitis. The FFRA was 180% during the second month, and this reached 210% after 8 months, during which time the transaminase level was consistently high. The ristocetin cofactor never increased during the course of the disease. Column chromatography of the patient's cryoprecipitate on Sepharose 4B showed the same abnormal elution pattern for FFRA and ristocetin cofactor seen in the first patient. These studies show that FFRA levels parallel the course of acute hepatitis and SGPT levels.

9133 RAPID TURNOVER SERUM PROTEINS IN FULMINANT HEPATITIS.

(Eng.) Kobayashi, K.; Kameda, S.; Sugimoto, T.; Suzuki, K.; Nishimura, K.; Kato, Y.; *et al.* (Kanazawa Univ. Hosp., 13-1, Takaramachi, Kanazawa, Ishikawa, 920 Japan). *Gastroenterol. Jpn.* 12(6):455-459; 1977.

To find reliable indices for the early diagnosis of fatal cases of viral hepatitis, the prealbumin and α_2-heat stable(HS)-glycoprotein levels were measured by immunodiffusion and the Normotest was carried out using sera from 78 patients with biopsy- or necropsy-verified acute viral hepatitis. The patients were divided into three groups according to clinical and histological features: group A, 23 cases of subacute fulminant hepatitis with submassive necrosis and serious signs (e.g., mental disturbance, edema, ascites); group B, 15 cases with zonal or submassive necrosis without serious signs; and group C, 40 cases with spotty necrosis. Fourteen group A patient died. All tests were done before the appearance of hepatic coma or gastrointestinal bleeding. No significant differences were found in the prealbumin (half-life 1-2 days) level between fatal and surviving patients. The α_2-HS-glycoprotein (half-life 4-6 days) level was significantly lower in the fatal group A cases (21.9 ± 7.4 mg/dl) than in the surviving group A cases (37.4 ± 6.9 mg/dl, $p<0.05$); moreover, there was a significant ($p<0.05$) difference between group A overall (27.5 ± 7.4 mg/dl) and group B (60.9 ± 13.9 mg/dl) and an increased value among 30% of group C with respect to the α_2-HS-glycoprotein level. The Normotest showed significantly ($p<0.05$) lower values among fatal group A cases (10.7 ± 4.3%) compared with surviving group A cases (45.3 ± 19.6%) and among group A cases overall compared with group B cases ($p<0.05$). There was a significant correlation between the levels of α_2-HS-glycoprotein and the values of the Normotest both for the 44 cases of acute hepatitis ($\gamma=0.766$, $p<0.01$) and for the 15 cases of subacute fulminant hepatitis alone ($\gamma=0.852$, $p<0.01$). These results indicate that the values of α_2-HS-glycoprotein and the Normotest may be used for early identification of patients at high risk of death from viral hepatitis in whom aggressive therapy may be of value if instituted early enough.

9134 FOUR AUTOPSY CASES OF NEONATAL GIANT CELL HEPATITIS DIED SUDDENLY AND UNEXPECTEDLY FROM INTRACRANIAL HEMORRHAGE.

(Eng.) Sugai, M.; Kono, R.; Hiroki, T.; Kunita, Y.; Tokudome, S. (Tokyo Medical Examiner Office, Tokyo, Japan). *Acta Pathol. Jpn.* 28(1):185-191; 1978.

The cases of four patients with neonatal giant cell hepatitis who died unexpectedly from intracranial hemorrhage are presented. The patients were one boy and three girls, aged 37 to 50 days old. The postnatal growth rate was retarded in all four infants. At autopsy, the most prominent features of the liver were turbidity and an icteric color on the cut surface. Histologically, the lobular structure was irregular, and the normal appearance of parenchymal cell cords was lost. Multinucleate cells were present in the center of the lobules. Bile canaliculi were absent or poorly preserved within these cells, and bile stasis was evident. There was massive iron pigment deposition in hepatocytes and Kupffer cells in the periportal area. These changes were present in all cases, but their severity differed between cases. The weight of the brain was increased because of the presence of edema in all patients. In most cases, the hemorrhage occurred subdurally due to a massive intracerebral hematoma in the region of the centrum semiovale.

9135 CHANGES OF THE ERYTHROCYTE MEMBRANE AND SERUM LIPIDS IN ACUTE HEPATITIS AND LIVER CIRRHOSIS.

(Ger.) Pristautz, H.; Stubchen-Kirchner, H.; Fereberger, W. (Medizinische Universitatsklinik, Auenbruggerplatz 15, A-8036 Graz, Austria). *Wien. Med. Wochenschr.* 128(4):99-103; 1978.

Changes in erythrocyte membrane lipids and their possible relationship to serum lipids were studied in 33 patients with acute viral hepatitis, 11 patients with nondecompensated liver cirrhosis, and 11 healthy probands. The erythrocyte osmotic resistance (EOR) was normal in 10/33 patients with acute viral hepatitis and elevated in 23. The SGOT level was significantly increased in the hepatitis patients with elevated EOR compared with those with normal EOR (306 ± 45 mU/ml versus 147 ± 29 mU/ml). The SGPT, γ-glutamyltransferase, and alkaline phosphatase (AP) levels showed no correlation with elevated EOR. In the hepatitis patients with elevated EOR, the serum triglyceride level was noticeably but not significantly higher than that in the patients with normal EOR (210 ± 19 versus 158 ± 19 mg/100 ml), but the erythrocyte membrane cholesterol level was increased in 20/33 patients with elevated EOR and in only 1/33 patients with normal EOR. Among the cirrhotic patients, all four with elevated EOR showed increased erythrocyte membrane cholesterol levels, but there was no significant correlation between the serum enzyme levels and EOR. The lipid electrophoresis pattern was pathological in almost all hepatitis and cirrhosis patients with elevated EOR. The erythrocyte changes seen in viral hepatitis were already demonstrable a few days after onset of the symptoms, and always disappeared after the normalization of the transaminase levels. The findings indicate that the increased incorporation of cholesterol into erythrocytes in acute hepatitis is due to a disorder in hepatogenic apolipoprotein synthesis, rather than to excessive serum lipoprotein supply.

9136 ACUTE VIRAL HEPATITIS TYPE B IN CROATIA (YUGOSLAVIA). (Eng.) Fiser-Herman, M.; Mihaljevic, I.; Borcic, B. (Blood Transfusion Center of Croatia, Zagreb, Yugoslavia). *Acta Med. Iugosl.* 32(1):33-43; 1978.

9137 PREVALENCE OF AUSTRALIA ANTIGEN AND ANTIBODY AND ITS SUBTYPES IN INDIA. (Eng.) Dutta, R. N.; Dutta, A. K. (Armed Forces Transfusion Center, Dehli, India). *J. Indian Med. Assoc.* 69(8):165-170; 1977.

9138 ACUTE VIRAL HEPATITIS. (Eng.) Woolf, I.; Williams, R. (King's Coll. Hosp., London, England). *J. Appl. Med.* 3(8):813-818; 1977.

9139 COMPLEMENT STUDIES IN SEVERE VIRAL HEPATITIS OF CHILDHOOD. (Eng.) Dupuy, C.; Dupuy, J. M. (INSERM U-56, Hopital d'Enfants, 78, rue General-Leclerc, 94270 Bicetre, France). *Pathol. Biol. (Paris)* 25(8):553-558; 1977.

9140 SERUM AND URINARY URIC ACID IN INFECTIOUS HEPATITIS. (Eng.) Raz, R.; Krivoy, N.; Rochman, J.; Eidelman, S. (Rambam Univ. Hosp., Haifa, Israel). *Isr. J. Med. Sci.* 13(12):1219-1221; 1977.

9141 THE RELATIONSHIP BETWEEN HEPATITIS B VIRUS INFECTION AND HEPATIC CELL CARCINOMA IN MOZAMBIQUE. (Eng.) Reys, L. L.; Purcell, R. H.; Holland, P. V.; Alter, H. J. (Faculty Medicine, Univ. Eduardo Mondlane, Mozambique). *Trop. Geogr. Med.* 29(3):251-256; 1977.

9142 ACQUIRED ENZYMOPATHY OF ERYTHROCYTE GLUCOSE-6-PHOSPHATE DEHYDROGENASE IN ACUTE VIRAL HEPATITIS. (Eng.) Kwiatkowska, J.; Kwiatkowska, D.; Andrzejak, R.; Zatonski, W. (Medical Sch., 10 Chalubinskiego, 50-368 Wroclaw, Poland). *Clin. Chim. Acta* 83(1/2):75-79; 1978.

9143 EARLY DIAGNOSIS OF HEPATIC INSUFFICIENCY IN PATIENTS WITH VIRUS HEPATITIS. (Rus.) Mikhailova, A. M.; Mel'nik, G. V. (Chernovtsy Medical Inst., Chernovtsy, USSR). *Vrach. Delo* (9):137-140; 1977.

9144 RICKETTSIAL GRANULOMATOUS HEPATITIS: THE VALUE OF LIVER BIOPSY. (Fre.) Faure, J.; Escande, J. C.; Grataloup, G.; Massot, Ch.; Faure, H. (C.H.U. de Grenoble, F 38700 La Tronche, France). *Nouv. Presse Med.* 6(32):2896; 1977.

9145 CLINICO-IMMUNOLOGICAL CHARACTERISTICS OF VIRAL HEPATITIS WITH SPLENOMEGALY. (Rus.) Lenartovich, L. S. (Kiev Scientific Res. Inst. Infectious Diseases, Kiev, USSR). *Vrach. Delo* (11):131-134; 1977.

See also, 9086, 9102, 9103, 9146.

LIVER AND BILIARY TRACT

Chronic Hepatitis

9146 STUDIES OF LYMPHOCYTOTOXICITY IN ACUTE AND CHRONIC LIVER DISEASE. (Eng.) Warnatz, H.; Gutmann, W.; Rosch, W.; Hommel, G. (Institut und Poliklinik f. klinische Immunologie der Universitat Erlangen-Nurnberg, Postfach 35 60, D-8520, Erlangen, W. Germany). *Z. Immunitaetsforsch.* 153(5):435-449; 1977.

The cytotoxicity of lymphocytes from 14 patients with chronic active hepatitis, 8 with chronic persistent hepatitis, 11 with acute hepatitis B, 12 with rheumatoid arthritis, and 32 normal controls was studied by a microcytotoxicity assay using ^{125}I-iododeoxyuridine-labeled embryonal liver cells and Chang cells as target cells. Unfractionated lymphocytes of the peripheral blood from patients with chronic active hepatitis and rheumatoid arthritis showed a high frequency of cytotoxic activity; the lymphocytotoxicity in chronic active hepatitis was significantly increased in comparison with that in normal controls ($p<0.025-0.05$) at the effector cell to target cell ratios of 10:1 and 100:1. Specificity of the cytotoxic reaction to target cells could not be demonstrated. Addition of autologous serum to the cytotoxic assay blocked the lymphocytotoxicity in patients with chronic active hepatitis. A weak potentiating effect on lymphocytotoxicity was observed in patients with hepatitis B (HB) after addition of autologous serum. This reaction may be due to the presence of HB surface antigen (HBsAg) in the serum, since addition of HBsAg from other sources also increased the lymphocytotoxicity in HB patients ($p<0.05$). This effect was not observed either in HBsAg-positive or in HBsAg-negative patients with chronic active hepatitis or chronic persistent hepatitis.

9147 LIVER SPECIFIC AUTOANTIBODIES AND IMMUNOCOMPLEXES IN CHRONIC ACTIVE HEPATITIS.

(Ita.) Realdi, G.; Trevisan, A.; Losi, C.; Tremolada, F.; Roul, A. (Istituto di Medicina Clinica, Policlinico dell'Universita, 35100 Padova, Italy). *Boll. Ist. Sieroter. Milan.* 56(5):476-488; 1977.

A direct immunofluorescent technique was used to detect IgG, IgM, complement component C_3, and hepatitis B surface antigen (HBsAg) on the membrane of isolated hepatocytes obtained from biopsies in three groups of selected patients: 12 patients with inflammatory liver diseases (chronic persistent hepatitis, chronic active hepatitis, alcoholic hepatitis, or cirrhosis), 7 patients with chronic immune complex diseases without liver damage (systemic lupus erythematosus, rheumatoid arthritis, Sjogren's syndrome, or idiopathic cryoglobulinemia), and 6 control patients with nonhepatic diseases. Autoantibodies directed against a liver-specific protein (LSP) were identified by an indirect immunofluorescent technique using isolated rabbit hepatocytes. HBsAg was detected on the hepatocyte surface only in two cases of chronic persistent hepatitis, where surface IgG and IgM were absent. In all other patients with inflammatory liver diseases and in all patients with immune complex diseases, membrane IgG and IgM were found. Only in the patients with chronic active hepatitis (CAH) was C_3 found on the liver cell membrane. The pattern of fluorescence was linear-granular (at different levels of focus) in HBsAg-negative CAH and in alcoholic hepatitis, and granular in all the other cases. Anti-LSP antibodies were detected in the sera of two patients with serological features of autoimmune CAH. These results confirm a possible pathogenic role of liver-specific autoimmunity in some cases of CAH but also point out the presence of immune complexes in the livers of all patients with circulating immune complexes, whether or not these patients have liver damage. In all these diseases, a clearance function of hepatocytes for circulating immune complexes may be postulated. The presence of complement on the hepatocyte surface in chronic active liver disease suggests a possible pathogenic role of some immune complexes, probably those formed by LSP and its antibody.

9148 CLINICAL SIGNIFICANCE OF THE VARIATIONS OF THE PLASMA PROTEINS IN CHRONIC HEPATITIS.

(Ita.) Pugliese, V.; Picciotto, A.; Testa, R.; Mansi, C. (Istituto Scientifico di Medicina Interna, Universita di Genova, Genova, Italy). *Minerva Dietol. Gastroenterol.* 23(4):301-306; 1977.

Changes in serum proteins in chronic hepatitis are reviewed, and data on 193 patients with laparotomy- and biopsy-confirmed cases are presented. Transaminase, alkaline phosphatase, gammaglobulin, and prothrombin levels were evaluated in 45 patients with chronic persistent hepatitis (CPH) and in 148 with chronic aggressive (or evolutive) hepatitis (CAH). Transferin and α_1-antitrypsin levels were normal in 25/25 patients; the orosomucoide level was diminished in 12% of the cases; the α_2-macroglobulin level was increased in 56%; and the C'3 complement fraction was increased in 36%. The IgG, IgA, and IgM levels were increased in 36%, 40%, and 20% of the subjects, resp. The hepato-Quick test was altered in 65% of the patients. Serious deviations in fibrinoginemia were not observed. Fifty percent of the CAH patients had hypergammaglobulinemia, 45% had altered SGOT levels, 38% had altered SGPT levels, and 25% had altered alkaline phosphatase levels. The values for CPH patients were 25%, 30%, 25%, and 10%, resp. It is concluded that seroproteins alone are not a precise diagnosti or prognostic pool but are more useful when correlated with other clinical and morphological data.

9149 DYNAMICS OF STOMACH FUNCTION INDICES DURI GLUCOCORTICOID THERAPY FOR CHRONIC HEPATITIS AND LIVER CIRRHOSIS IN CHILDREN.

(Rus.) Deputatova, L. D. (Dept. Pediatrics, S. M. Kirov Gorkii Medical Inst., Gorkii, USSR). *Vopr. Okhr. Materin. Det.* 21(9):36-41; 1976.

9150 EFFECT OF GLUCOCORTICOIDS ON THE CLINICAL COURSE AND SOME INDICES OF NITROGEN METABOLISM IN PATIENTS WITH CHRONIC VIRAL HEPATITIS.

(Rus.) Melk, M. V. (Leningrad Inst. Pediatric Medicine, Leningrad, USSR). *Vrach. Delo* 6:137-139; 1976.

See also, 8828, 9079, 9080, 9085, 9086, 9096, 9126, 9129, 9130, 9131, 9137.

Alcoholic Liver Disease

9151 SERUM ALPHA-FETOPROTEIN IN ALCOHOLIC LIVER DISEASE. (Fre.) Dedieu, P.; Simon, J.; Chatal, J. F.; Buzelin, F.; Le Portz, J.; Miniconi, P. (Hopital Saint-Jacques, C.H.R., F44035 Nantes Cedex, France). *Gastroenterol. Clin. Biol.* 2(1): 7-14; 1978.

To determine the frequency and importance of the elevation of serum alpha-fetoprotein (AFP) level and to correlate these levels with clinical, biological, and anatomical-pathological findings, the serum AFP level was measured by radioimmunoassay in 210 patients with alcoholic liver diseases and in 139 controls. The serum AFP level was significantly elevated ($p<0.001$) in all three patient groups compared with the level in the controls (6.41 ± 1.40 ng/ml); it was >10 ng/ml in 14% of the 41 patients with alcoholic hepatopathy without cirrhosis (average, 9.2 ± 8.5 ng/ml), in 20% of the 146 patients with alcoholic cirrhosis, and in 15/23 patients with alcoholic cirrhosis and primary liver carcinoma. Serum AFP levels higher than 100 ng/ml were observed only in the patients with cirrhosis and the 21 with hepatomas. Among the patients with alcoholic cirrhosis, the serum AFP level was significantly elevated in all subgroups (compensated cirrhosis, isolated icterus, and ascites plus edema, $p<0.001$, and ascites plus edema plus icterus, $p<0.01$) except in the 29 patients with hepatic encephalopathy. There was no significant correlation between serum AFP levels and clinical manifestations, biochemical disorders, or histological lesions in any patients. In abstinent patients, serum AFP, after a transient elevation, tended to decrease progressively and return to normal level in 3 weeks. No correlation was found between serum AFP level and the survival time of the 21 patients with hepatoma. In the two patients with colangioma, serum AFP level was normal. It is concluded that, in patients with alcoholic cirrhosis, a serum AFP level >100 ng/ml or one that fails to decrease after abstinence strongly suggests the development of hepatoma.

9152 SERUM GAMMA-GLUTAMYL TRANSPEPTIDASE ACTIVITY IN HEPATOBILIARY DISEASE: ROLE OF CHRONIC ALCOHOLISM. (Fre.) Faivre, J.; Lamblot, J.; Michalet, J. P.; Massart, J. P.; Klepping, C. (Hopital General, 1, rue de l'Hopital, F 21033 Dijon Cedex, France). *Lyon Med.* 239(2):55-59; 1978.

Serum gamma-glutamyltranspeptidase (γGT) activity was studied in 30 normal subjects, 30 nonalcoholic patients without hepatobiliary disease, 79 patients with alcoholic liver cirrhosis (36 confirmed by biopsy), 34 chronic alcoholics without liver pathology, 49 patients with liver cancer, 30 patients with biliary duct obstruction, and 19 patients with acute benign viral hepatitis to determine its diagnostic value in liver disease. Levels of serum alkaline phosphatase, prothrombin, total bilirubin, and SGPT were also measured. Patients who had liver cancer and who were also chronic alcoholics had the highest γGT levels. All patients who were chronic alcoholics had elevated serum γGT levels; abstinence from alcohol resulted in a drop to normal levels, but if cirrhosis was present, return to normal levels was not consistently observed. In patients who were not chronic alcoholics, there was a marked correlation between levels of alkaline phosphatase and γGT; the correlation was not observed in alcoholics. Elevated γGT levels may indicate liver cancer in nonalcoholic patients, but the effect of alcohol consumption on γGT levels obscures the diagnostic value of γGT levels in alcoholics. Measurement of γGT should not be substituted for that of SGPT levels in patients with viral hepatitis since the enzyme is not as specific an indicator for these patients.

9153 THE IMMUNOPATHOLOGY OF ALCOHOLIC HEPATITIS: RECENT FINDINGS. (Ita.) Lovisetto, P.; Actis, G. C.; Marchi, L.; Ferraris, R.; Biarese, V. (Istituto di Medicina Interna, Universita degli Studi Torino, Torino, Italy). *Minerva Med.* 68(62): 4147-4151; 1977.

Recent findings on the immunopathology of alcoholic hepatitis are reviewed and discussed. Epidemiological studies show that 30% of heavy drinkers have liver problems associated with alcohol, and 10% develop liver cirrhosis in 1-12 yr. The hepatopathy of the alcoholic cannot be attributed exclusively to the toxic effects of ethanol; immunologic factors are believed to play a leading role. Hypergammaglobulinemia (IgG, IgA, and IgM) has been noted in patients with liver cirrhosis. Serum IgA from these patients binds to Mallory bodies, and in the initial phase of alcoholic hepatitis, it is possible to find serum antibodies to Mallory bodies. In patients with hepatopathy from alcohol, antibodies to albumin have also been found. It is hypothesized that the specific antigenicity of albumin in these cases has been altered by acetaldehyde, a product of ethanol metabolism. As many as 50% of these patients have been reported to have a reduced skin reactivity to dinitrochlorobenzene, and many have a diminished blast transformation of lymphocytes in response to phytohemagglutinin. A correlation has been found between the inability of a patient's lymphocytes to form spontaneous rosettes with sheep RBC and the degree of alcoholic liver damage in cases of cirrhosis. The leukocyte migration inhibition test shows that WBC from these patients produce migration inhibition factor in response to Mallory bodies or homogenates of healthy livers. It has been demonstrated that the supernatant fraction from a culture of patient lymphocytes incubated with Mallory bodies augments the incorporation of proline into collagen. The therapeutic implications are to treat the patient with corticosteroids that act against the immune system and with colchicine, an inhibitor of collagen formation.

9154 ENTERAL LIPID ABSORPTION IN PATIENTS WITH PORPHYRIA CUTANEA TARDA AND IN ALCOHOLICS.

(Ger.) Siklosi, C. (Universitats-Hautklinik Szeged, Szeged, Hungary). *Z. Hautkr.* 51(10):387-392; 1976.

Because lipid metabolism reacts promptly to any deterioration of hepatic and pancreatic function, enteral lipid absorption was investigated in 28 porphyria cutanea tarda (PCT) patients, in 21 chronic alcoholics, and in 20 dermatology patients without metabolic diseases (controls). Blood samples taken before as well as 2, 4, and 6 hr after the p.o. administration of Lipiodol Ultrafluid (an iodonated marker medium, 0.04 ml/kg body weight) w[illegible]d using potentiometry. Serum iodine levels decreased in the 6 hr following Lipiodol administration: by 82.14% in the PCT patients, 52.38% in the alcoholics, and 25% in the control group. The abnormally low value in the control group was attributed to the failure of some individuals to eat following Lipiodol intake. Thus, the Lipiodol test can provide information about the functional state of the small intestine mucosa only in cases of undisturbed digestive gland function. The advantages of the method include its simplicity, its very small probability of false positives, and it can provide information about the type of intermediary metabolism. However, this method provides reliable information only about the state of enteral absorption.

9155 COAGULATION FACTORS AND OTHER PLASMA PROTEINS DURING ABSTINENCE AFTER HEAVY ALCOHOL CONSUMPTION IN CHRONIC ALCOHOLICS.

(Eng.) Wallerstedt, S.; Cederblad, G.; Korsan-Bengtsen, K.; Olsson, R. (Sahlgrenska sjukhuset, S-413 45, Goteborg, Sweden). *Scand. J. Gastroenterol.* 12(6): 649-655; 1977.

Variations in the concentrations of different liver-synthesized coagulation factors and other plasma proteins were studied in the withdrawal period after prolonged alcohol consumption in 19 male chronic alcoholics. The mean duration of chronic alcoholism was 11 ± 9 yr. The duration of the last debauch was 25 ± 30 days, and the final daily ethanol consumption during the last debauch was 354 ± 97 g. The coagulation factor levels were generally within the reference limits. In fact, the mean levels of factors VIII, IX, and XII were above the upper reference limits, the values being 153 ± 12%, 155 ± 14%, and 214 ± 21%, resp., in samples taken 1-3 days after the end of the debauch and 167 ± 19%, 152 ± 14%, and 198 ± 20%, resp., in samples taken 7-10 days after the end of the debauch. The variables reflecting the fibrinolytic system, i.e., lysis area (148 ± 5 and 149 ± 4 mm^2 on day 1-3 and day 7-10, resp.) and plasminogen (16.6 ± 1.0 and 18.2 ± 0.7 U/ml, resp.), were generally within the reference range, as were antithrombin III (97 ± 5% and 112 ± 5%, resp.) and alpha$_2$-macroglobulin (77 ± 3% and 83 ± 4%, resp.). The number of platelets was often low, and the mean value at day 1-3 was just above the lower reference limit (reference range 150-350 x 10^9/l; mean level in patients 163 ± 13 x 10^9/l). However, the platelet adhesiveness was generally within the reference range. During the 1st week, a significant increase occurred in the factor XI activity, the antithrombin III level, and the number of platelets, the levels being 127 ± 13% (increasing from 96 ± 7% at day 1-3, $p<0.01$), 112 ± 5% ($p<0.05$), and 239 ± 23 x 10^9/l ($p<0.01$) on day 7-10, resp. In samples taken on day 1-3, other plasma proteins were usually within the reference limits. During the 1st week, a significant increase occurred in prealbumin (from 0.224 ± 0.012 on day 1-3 to 0.255 ± 0.011 g/l on day 7-10, $p<0.01$), transferrin (from 2.30 ± 0.12 to 2.59 ± 0.11 g/l, $p<0.05$), and complement components C3 (from 0.70 ± 0.03 to 0.89 ± 0.05 g/l, $p<0.01$) and C4 (from 0.211 ± 0.013 to 0.247 ± 0.017 g/l, $p<0.01$). Orosomucoid, IgG, IgA, and IgM levels decreased significantly during the same period ($p<0.05$, $p<0.01$, $p<0.01$, and $p<0.05$, resp.). A significant correlation between the fibrinogen concentration and ESR was observed ($p<0.01$). The data indicate that the protein-synthesizing capacity of the liver is well preserved in the patients in spite of a decade of chronic alcoholism.

9156 LIVER INJURIES IN ALCOHOLICS. (Eng.)

Abe, H.; Ikejiri, N.; Harada, K.; Ren-Pan, L.; Tanikawa, K.; Yokoyama, T.; *et al.* (Kurume Univ. Sch. Medicine, Kurume, 830, Japan). *Kurume Med. J.* 25(1):53-64; 1978.

The relationship of alcohol consumption to clinical findings, laboratory data, and liver histology was studied in 174 alcoholics. Histologically, there were 51 patients with minimal liver changes (M), 46 with fatty liver (F), 19 with fibrosis (Fi), 21 with alcoholic hepatitis (A), and 37 with cirrhosis (C). Alcoholic hyalin was seen in 4 patients with A and in 10 patients with C. Hepatomegaly was found in 108 patients, jaundice in 64, and esophageal varices in 13. Hepatomegaly was significantly ($p<0.025$) greater in patients with A and C than with M. The SGOT values were significantly higher ($p<0.005$) in patients with F, A, and C than with M and Fi. There was a significant ($p<0.001$) correlation between the SGOT level and both the lactate dehydrogenase (LDH) and creatinine phosphokinase (CPK) levels. SGPT values were also significantly higher in patients with A ($p<0.005$), F ($p<0.025$), and C ($p<0.05$) than with M and Fi. The SGOT/SGPT ratio was elevated in all groups. The SγGPT level was also markedly elevated in all groups and was significantly higher in patients with A ($p<0.005$), Fi ($p<0.01$), and F ($p<0.025$) than with M. The serum alkaline phosphatase level in patients with C was significantly higher ($p<0.05$) than in those with M. Compared with M, elevations in total serum bilirubin level, in the rate of indocyanin green retention, and in the serum gammaglobulin level in patients with A and C were significant ($p<0.025$, <0.05, and <0.05, resp.) as was the lowering of the serum albumin level ($p<0.05$). Total serum cholesterol level was significantly ($p<0.05$) lower in patients with C than with M. The serum malonic dialdehyde (MDA) levels were elevated in all groups. Hepatitis B surface antigen was positive in 11.5% of the cases, indicating involvement of the hepatitis virus.

No significant changes in age and duration distribution were found among the groups and, while no significant differences in the daily and total alcohol consumption were observed, the trend was for patients with Fi to have a long duration and relatively small quantity of alcohol intake and for patients with C to have a long duration and a large quantity of alcohol intake. The authors conclude that while the amount and duration of alcohol intake is closely related to cirrhosis, other factors must be considered in the pathogenesis of alcoholic liver disease. [illegible] h average MDA values recorded sug[illegible] of lipoperoxide in the development [illegible] liver injuries.

9157 CLASSIFICATION AND FREQUENCY OF ALCOHOLIC LIVER DAMAGE. (Ger.) Roschlau, G. (Medizinischen Akademie "Carl Gustav Carus," Fetscherstr. 74, DDR-8019 Dresden, E. Germany). *Dtsch. Gesundheitsw.* 32(16):721-724; 1977.

9158 INVESTIGATION OF THE CELLULAR IMMUNE REACTIVITY IN ALCOHOLIC LIVER DAMAGE. (Ger.) Otto, L.; Nilius, R.; Busse, H. J.; Zipprich, B. (Klinikum Krollwitz, Ernst-Grube-Strasse, PSF 63, DDR-401 Halle [Saale], E. Germany). *Z. Gesamte Inn. Med.* 32(12):271-274; 1977.

9159 DEVELOPMENT OF TEMPORARY ASCITES IN ALCOHOLIC HEPATITIS. (Ger.) Poegel, K. (Stadtkrankenhaus Dresden-Neustadt, Industriestr. 40, DDR-8023 Dresden, E. Germany). *Dtsch. Gesundheitsw.* 32(30):1413-1415; 1977.

See also, 8818, 8828, 9079, 9165, 9171, 9233.

LIVER AND BILIARY TRACT

Cirrhosis

9160 CHANGES IN THE ACID-BASE EQUILIBRIUM IN LIVER CIRRHOSIS FOLLOWING PORTASYSTEMIC ANASTOMOSIS. (Ita.) Conte, G.; Semplicini, A. (Clinica Medica Generale II, Universita, Padua, Italy). *Recent. Prog. Med. (Roma)* 63(5):539-546; 1977.

Disturbances in acid-base equilibrium in hepatic cirrhosis induced by portasystemic anastomosis (respiratory alkalosis, metabolic alkalosis, and metabolic acidosis) are reviewed. The primary contributing factor to respiratory alkalosis after bypass surgery is the abnormally high serum level of ammonia, which stimulates the respiratory center and produces hyperventilation. The increase in serum ammonia is only in part lessened by a hypoprotein diet and by the use of antibiotics. Deteriorated liver functions also account for the increase in serum ammonia level as well as in the blood levels of lactate and pyruvate (probably further elevated by the increased activity of phosphofructokinase in an alkaline environment) and contribute to elevated levels of estrogen and progesterone. The respiratory alkalosis following bypass surgery can have secondary manifestations: reduction of the flow of blood to the brain (with symptoms of hyperammonemic encephalopathy), tetany and paresthesia due to decreased serum Ca levels. Respiratory alkalosis can be treated with chlorohydrated arginine. The most important cause of metabolic alkalosis after anastomosis is the depletion of potassium levels caused by the hypoprotein diet, impaired liver functions, and diuretic treatments. Diuretic treatments produce hyperaldosteronism because the loss of Na^+ and Cl^- contracts the extracellular volume and activates the renin-angiotensin system. The ultimate effects of the increase in aldosterone are increased elimination of K^+ and H^+, increased tubular reabsorption of HCO_3^-, diminished reabsorption of NaCl, and passage of extracellular H^+ into cells. Patients who have undergone anastomosis should be given KCl to decrease the incidence of postoperative metabolic alkalosis. Metabolic acidosis is a less frequent but more serious occurrence, caused by an increase in the production of hydrogen ions due to increased blood levels of lactate and pyruvate that result from profound derangements in carbohydrate metabolism. Decreased renal elimination of H^+ and an increase in H^+ concentration via the i.v. administration of acidic solutions also contribute to metabolic acidosis. If metabolic acidosis occurs after anastomosis, the use of acidic venous solutions and furosemide should be avoided.

9161 ALPHA$_1$-ANTITRYPSIN DEFICIENCY--A LITERATURE REVIEW AND A CASE REPORT OF A PA-

TIENT WITH CHRONIC OBSTRUCTIVE AIRWAYS DISEASE AND CIRRHOSIS. (Eng.) Coughlin, G. P.; van Deth, A. G.; Ey, G. T.; Grant, A. K. (Queen Elizabeth Hosp., Woodville, South Australia 5011, Australia). *Aust. N.Z. J. Med.* 7(4):400-403; 1977.

The case of a 52-yr-old man with alpha$_1$-antitrypsin deficiency (consistent with a state homozygous for the PiZ allele) is presented, and the literature concerning such cases is reviewed. The patient presented with a 12-yr history of increasing dyspnea on exertion and a productive cough. Clinical examination revealed severe obstructive deficit, panlobular emphysema, right ventricular hypertrophy, and an alpha$_1$-antitrypsin level of 50 mg/dl. Over the next 6 yr, he developed right heart failure, collapse of the thoracic vertebrae, renal failure, and mixed hepatitic-cholestatic liver function abnormalities (hepatitis B surface antigen was persistently negative). Postmortem examination revealed severe panlobular emphysema, extensive bullous changes throughout the lungs, patchy bronchopneumonia, mild fibrinous pleuritis, small amounts of thrombo-embolic material and occasional bone marrow emboli in the peripheral pulmonary arteries, marked right ventricular hypertrophy and dilatation, mild ischemic fibrosis of both ventricles, established micronodular cirrhosis with scattered areas of fatty change, numerous eosinophilic spherical intracytoplasmic PAS-positive and diastase resistant hyaline bodies in the hepatocytes, numerous intracytoplasmic inclusions bound by rough endoplasmic reticulum, mild vacuolar nephropathy, marked hypertrophy of the median lobe of the prostate, and slight dilatation of the ureters (suggesting bladder-neck obstruction as a cause for renal failure).

9162 CHOLESTATIC LIVER CIRRHOSIS WITH AUTOIMMUNE PHENOMENA IN IDENTICAL TWIN GIRLS. (Ger.) Kirchhof, M.; Dammermann, R.; Lindner, H.; Berg, P. A.; Kloppel, G. (DRK-Krankenhaus, Beim Schlump 84, 2000 Hamburg 13, W. Germany). *Therapiewoche* 28(6):1105-1106; 1978.

Cholestatic liver cirrhosis with portal hypertension and esophageal varices was found in two 45-yr-old identical twin sisters. Mitochondrial antibodies were sometimes present during the early stage of the disease, never during the final stage. The IgM level was not increased. A combination of antinuclear factors of nucleolar type, antibodies to smooth muscles, and cytoplasmic antibodies to kidneys, stomach, and thyroid cells were found. Nuclear antibodies were found in 4/12 children of the identical twins, but there were no manifest hepatopathies. The father of the identical twins had had liver disease (not specified) and pernicious anemia. The findings justify antibody tests in family members of patients with autoimmune chronic liver diseases.

9163 WHOLE GUT IRRIGATION WITH ISOTONIC MANNITOL SOLUTION IN TREATMENT OF GASTROINTESTINAL BLEEDING DUE TO CIRRHOSIS: A CONTROLLED STUDY. (Fre.) Hecketsweiler, P.; Colin, R.; Ouvry, D.; Galmiche, J. P.; Paillot, B.; Geffroy, Y. (Hopital Charles-Nicolle, F 76038 Rouen Cedex, France). *Gastroenterol. Clin. Biol.* 2(2):145-152; 1978.

Whole-gut irrigation with an isotonic mannitol solution (40 g/l) containing 17 mM NaCl, 13 mM KCl, and neomycin sulfate (250 mg/l) was used to treat gastrointestinal bleeding in 29 patients with liver cirrhosis, and the results were compared with those obtained in 30 age-, sex-, and symptom-matched controls treated without gut irrigation. All patients had portal hypertension secondary to alcoholic cirrhosis, and blood was present in the upper gastrointestinal tract although the hemorrhage source (such as esophageal varices or gastroduodenal lesions) was not always known. After fibroscopy examination and balloon tamponade insertion for hemorrhage, the control patients received gastric lavage and aspiration, neomycin (0.75 g), and lactulose (50 ml) and the study group received mannitol solution (5 l, 33 ml/min perfusion). Twelve hours later and every 12 hr during the period the patient was bleeding, 0.75 g neomycin and 50 ml lactulose were administered.
In the treatment group, only one patient developed hepatic encephalopathy (HE) in the 24 hr after treatment, whereas in the control group, five developed HE ($p=0.08$). Five and nine patients in these two groups resp., had HE before the study; regression of HE occurred in four of five in the first 24 hr after gut irrigation but in none of the control patients ($p=0.01$). After 24 hr of the study, 2/29 and 13/26 patients in the treatment and control groups, resp., had HE ($p<0.001$). In the control group, 3 patients died in the first 12 hr of the study and 10 more died of hemorrhage or HE within 12 days of admission. In the treatment group, only four patients died within the 12-day period ($p<0.02$). The duration of hemorrhage was not significantly different in the two groups, but the number of units of blood required to maintain a hematocrit of 35% was significantly less ($p<0.02$) in the treatment group. Of 18 controls and 22 treatment patients who entered the study without ascites and who were alive on the 7th day of the study, 8 and 2 patients, resp., developed ascites ($p<0.05$). Gut irrigation with an isotonic mannitol solution appears to prevent HE in cirrhotic patients with gastrointestinal hemorrhage and to improve prognosis.

9164 GASTRIC NARROWING WITH INTRALUMINAL FILLING DEFECT IN A 55-YEAR-OLD WOMAN. (Eng.) Margolies, M. N.; Galdabini, J. J.; McNeely, B. U. (Massachusetts General Hosp., Boston, MA). *N. Engl. J. Med.* 298(23):1301-1307; 1978.

A case record is presented concerning a woman with a life-long history of portal hypertension due to neonatal portal vein thrombosis who was admitted to the hospital with progressive epigastric burning pain, which was relieved promptly by vomiting. Seven months before admission, a radiologic abnormality in the gastric antrum had been detected after an episode of upper gastrointestinal bleeding. This had been treated with antacid, diazepam, atropine, and ferrous sulfate. After 4 months she began to experience the abdominal pain for which she was finally hospitalized. The patient had been under emotional stress. Laboratory findings were normal except for occult blood in the stool. Radiologic examination demonstrated gallstones and a stenotic lesion in the antrum that had progressed over a period of several months with the subsequent appearance of an intraluminal filling defect. Among the diseases considered and rejected in the differential diagnosis were Crohn's disease, benign gastric tumors, carcinoma of the gastric antrum, and lymphomas of the stomach. Gallstones were considered to be an incidental finding, and diagnosis was made of a cicatricial peptic ulcer with obstruction due to a foreign body retained in the stomach, a gastric bezoar. The bezoar was confirmed and removed endoscopically. It measured 2 x 1.5 x 1.1 cm, and was ovoid, firm, and externally greenish-black, with a gray interior. An irregular central cavity was filled with saprophytic bacteria and fungi. Microscopic examination showed it to be a phytobezoar, consisting of granular plant parenchyma and a few plant vascular elements.

9165 MALABSORPTION OF VITAMIN D IN MAN AND RAT WITH LIVER CIRRHOSIS.

(Eng.) Meyer, M.; Wechsler, S.; Shibolet, S.; Jedwab, M.; Harell, A.; Edelstein, S. (Dept. Internal Medicine D, Ichilov Hosp., 6 Weizmann St., Tel Aviv, Israel). *J. Mol. Med.* 3(1):29-37; 1978.

To localize the defect in vitamin D metabolism leading to the reduced circulating level of 25-hydroxyvitamin D observed in liver cirrhosis, vitamin D metabolism and absorption were studied in four patients with alcoholic or postnecrotic liver cirrhosis, three control patients, and 20 male Wistar rats with carbon tetrachloride-induced cirrhosis. In neither cirrhotic patients nor cirrhotic rats was there impairment of the conversion of i.v injected tritiated vitamin D to 25-hydroxyvitamin D. However, the level of cholecalciferol in the blood of both patients and cirrhotic animals that received tritiated cholecalciferol intragastrically was significantly lower at all times studied than that in the controls ($p<0.01$). It appears that impaired absorption of dietary vitamin D-3 may contribute to or be one of the etiologic factors in reducing the serum 25-hydroxyvitamin D levels in liver cirrhosis.

9166 FAMILIAL LIVER CIRRHOSIS IN PSEUDOHYPOPARATHYROIDISM IN YOUNG CHILDREN.

(Ger.) Thanner, F.; Kuhner, U.; Pfeifer, U. (Universitaets-Kinderklinik Wurzburg, Joseph-Schneider Strasse 2, 8700 Wurzburg, W. Germany). *Dtsch. Med. Wochenschr.* 103(12):519-523; 1978.

The appearance of pseudohypoparathyroidism (PHPT) in infancy has not been described previously, nor has the combination of PHPT and severe congenital liver disease. Two cases of this nature are described: two girls whose mother had PHPT developed PHPT with congenital liver damage. The first girl developed icterus on the fourth postnatal day, and was hospitalized at 2 months for persistent icterus and dystrophy. She was rehospitalized at 2 yr with hepatomegaly and splenomegaly, hypocalcemia, hyperphosphatemia, thrombocytopenia, and possible tetany. Laparoscopy showed postnecrotic hepatic cirrhosis with beginning portal hypertension. Histology of hepatic tissue demonstrated almost complete cirrhosis in some areas, areas of fibrosis, hyaline single cell necrosis, intracellular fat accumulation, and siderin present in parenchyma and stellate cells. Mesenchyme activity showed that the process was continuing. The child died at 4 yr following internal hemorrhage, despite treatment with calcium and vitamin D. The second girl, with prenatal dystrophy, was shown to have fatty liver deposits, isolated hyalin liver necrosis, and centrilobular multinuclear giant cells at birth. The course of the disease in this child was similar to that in her sister. Therapeutic administration of dihydrotachysterol, vitamin D, and calcium improved the state of the disease only transiently. Liver biopsy at 1.5 yr demonstrated the presence of "ectoplasmic vacuoles" by electron microscopy. The authors suggest that this combined disorder in calcium and liver metabolism may be the result of a genetic defect, as known metabolic or inflammatory cell diseases were excluded.

9167 ACUTE RENAL INSUFFICIENCY DUE TO NECROSIS OF THE RENAL MEDULLA IN CIRRHOTIC PATIENTS.

(Fre.) Dequiedt, P.; Dequiedt, F.; Vanhille, P.; Raviart, B.; Lambert, P.; Mouton, Y.; *et al.* (Hopital G. Dron, 59208 Tourcoing, France). *Lille Med.* 21(8):674-678; 1976.

The frequency, clinical profile, differential diagnosis, pathology, and treatment of acute renal insufficiency due to medullary necrosis of the kidneys and associated with liver cirrhosis are reviewed, and clinical profiles of three male patients (ages 54, 45, and 47 yr, resp.) are given. Insufficiency, which occurs in 2% of cirrhotics, is usually of sudden onset with oliguria accompanied by a severe infection. Two of the three patients had prodromal symptoms: pain and fever in one case and urinary infection and hematuria in the others. All three patients had accompanying lumbar pain, but icterus was present in only two. Plasma creatinine and urea levels were elevated, and the Na^+/K^+ ratio was >1. Correction of the acid-base balance and administration of antibiotics were used to treat the patients; however, two died on the 11th and 12th days, resp., following onset of renal insufficiency. Pathology other than kidney necrosis (acute pancreatitis, hematological interstitial nephritis, and acute tubulonephritis) can be the cause of acute renal insufficiency in chronic liver cirrhosis. Acute renal insufficiency of an apparent organic cause accompanied by septicemic infection in a cirrhotic patient should indicate the diagnosis of kidney necrosis. Changes in the kidney circulation during liver cirrhosis lead to medullary necrosis and thrombosis.

9168 SERUM CONCENTRATIONS AND URINARY EXCRETIONS OF ZINC IN CIRRHOSIS, NEPHROTIC SYNDROME AND RENAL INSUFFICIENCY.

(Eng.) Lindeman,

R. D.; Baxter, D. J.; Yunice, A. A.; Kraikitpanitch, S. (Veterans Admin. Hosp., 921 N.E. 13th St., Oklahoma City, OK 73104). *Am. J. Med. Sci.* 275(1): 17-31; 1978.

Serum Zn concentrations were measured in 12 patients with cirrhosis, 23 patients with nephrotic syndrome, and 13 patients with renal insufficiency to document the frequency of low serum Zn concentrations and to define the importance of urinary loss of Zn in the Zn deficiency commonly seen in these patients. Multiple correlations between the urinary zinc and protein excretions, and the patterns of binding between added radiozinc and serum and urine proteins determined by column chromatography and polyacrylamide gel electrophoresis were used to determine differences between the patients and 16 normal controls. The mean serum Zn concentrations were 90, 76, 66, and 49 μg/100 ml in normal, azotemic, nephrotic, and cirrhotic subjects, resp., the latter two values being significantly different ($p<0.01$) from the normal value. The mean 24-hr urinary Zn excretion was increased in the cirrhotic ($p<0.05$) and nephrotic patients relative to controls. In the azotemic group, the mean urinary Zn excretion was lower than in controls. No correlation ($r=0.097$) was found between serum Zn concentrations and urinary Zn excretions in the four groups combined, nor was there a significant relationship between serum Zn concentration and urinary protein excretion ($r=0.272$). There was a significant positive correlation ($r=0.340$, $p<0.05$) between serum Zn and albumin concentrations in the four groups combined but not for any individual patient group. In the nephrotic patients, there was a significant correlation between urinary Zn and protein excretions of ($r=0.431$, $p<0.05$). Sephadex G-200 gel chromatographic patterns for the sera and urine of controls and cirrhotic patients were similar except that, in the patients, peak II (containing albumins and prealbumins) was decreased. The patterns for the other two patient groups were less consistent, but both nephrotic and azotemic patients showed significant ($p<0.001$) increases in serum peak III (containing low molecular weight proteins, polypeptides, and amino acids) when compared with normal subjects. Polyacrylamide gel electrophoresis showed the mean percentage of radiozinc added to the serum that bound in the albumin peak was 95, 76, 47, and 63% in normal, cirrhotic, nephrotic, and azotemic patients, resp. The current study adds to the available data on Zn deficiency in cirrhotic, nephrotic, and azotemic patients but it remains unclear whether the low serum Zn concentrations are indicative of true clinical or subclinical Zn deficiency or simply reflect a decrease in available Zn-binding proteins or prealbumin.

9169 TUBULAR RENAL ACIDOSIS DURING LIVER CIRRHOSIS.

(Ita.) Triolo, R.; Carelli, E.; D'Alessio, R.; Italiano, F. (I Divisione di Medicina Generale, Ospedale Martini, Torino, Italy). *Minerva Med.* 68(53):3627-3642; 1977.

To investigate the behavior of the acid-base equilibrium in cirrhosis of the liver and to determine the effects of this disease on tubular renal functions, blood and urine analyses were made in 23 patients with liver cirrhosis. SGOT, SGPT, LDH, alkaline phosphatase, protein, bilirubin, glucose, calcium, phosphorus, sodium, potassium, chlorine, ammonia, bicarbonate, creatinine, and pH levels were determined. Patients were divided into three groups: seven patients with plasma pH <7.37 (group 1), four patients with a loss of bicarbonate (group 2), and two patients with plasma pH <7.37 without a loss of bicarbonate (group 3). The plasma analyses showed that the bicarbonate level was low i all three groups, with levels in group 3 being the lowest. Ammonia levels were normal in group 3 and raised in groups 1 and 2. Sodium was normal in groups 2 and 3 and low in group 1. Phosphorus was normal in patients with acidosis and loss of bicarbonate but low in the other patients. The bilirubin level was high in groups 1 and 2. The urine analyses revealed that ammonia levels were normal in all three groups. The acidity was normal in groups 1 and 3 but low in group 2. The bicarbonate filtrates were reduced in groups 1 and 3 and in patients with tubular renal acidosis type II complete, but it was raised in patients with tubular renal acidosis type II incomplete. The percentage of reabsorbed bicarbonate was reduced in group 2. The loss of sodium via the urine was greatly augmented in all three groups. It was calculated that 18 of the patients had supercompensated metabolic acidosis, and 5 had normally compensated metabolic acidosis.

9170 ELECTIVE DECOMPRESSION OF ESOPHAGEAL VARICES BY DISTAL SPLENO-RENAL BYPASS USING WARREN'S METHOD.

(Fre.) Mosimann, R.; Loup, P. (Centre Hospitalier Universitaire Vaudois, 1011 Lausanne, Switzerland). *J. Chir. (Paris)* 114(3): 175-184; 1977.

The results of treatment by splenorenal bypass in 22 patients with hemorrhaging esophageal varices related to liver cirrhosis and portal hypertension are presented. The cirrhosis was due to alcohol in 12 patients, to hepatitis in 8, to primary biliary cirrhosis in 1, and to alcoholic steatosis in 1. A termino-lateral anastomosis of the splenic and renal veins was performed in 12 patients (Warren's original method), and a termino-terminal anastomsis with ligature of the renal vein before the branching of the suprarenal and gonadal veins was performed in 10 patients. Two patients died postoperatively, one of hemorrhage from a duodenal stress ulcer and the other in hepatic coma following two reoperations for thrombosis of the shunt. Stenosis of the shunt occurred in another patient who survived but required portacaval anastomosis to control massive new hemorrhaging. Retrogastric lymphocele requiring drainage complicated the postoperative course of a fourth patient. Barium transit studies carried out in 17/20 surviving patients indicated disappearance or decrease of the esophageal varices in 13. In addition to the two patients who died postoperatively and the survivor who rebled, two other survivors hemorrhaged again, one at 6 months (autopsy revealed thrombosis of the portal vein and erosive gastritis, but the shunt was patent) and one after many months following an episode of alcohol abuse. No other patients rebled. In addition to this one late death, four other patients died during the follow-up period, all due to hepatic insufficiency. Twelve patients who had been followed for 6 months to 7 yr (average 2.5 yr) were still alive. One of the survivors had temporary encephalopathy in the early postoperative period. This operation is useful in treating portal hypertension when there is satisfactory portal blood flow, but it is contraindicated in the case of greatly reduced or inverted portal flow or in case of ascites or marked stasis of the splanchnic or retroperitoneal lymphatic network.

9171 THE CHANGING PATTERN OF LIVER DISEASE IN SOUTH AFRICAN BLACKS. (Eng.) Isaacson, C. (South African Inst. Medical Res., Johannesburg, South Africa). *S. Afr. Med. J.* 53(10):365-368; 1978.

9172 EXTRAHEPATIC ELIMINATION OF GALACTOSE IN MAN [Abstract]. (Eng.) Ranek, L. (Rigshospitalet, Copenhagen, Denmark). *Digestion* 16(4): 329; 1977.

9173 THE USE OF LACTULOSE IN PORTAL-SYSTEMIC ENCEPHALOPATHY. (Eng.) Matthews, S. J. (Hartford Hosp., Hartford, CT). *Conn. Med.* 42(2): 96-97; 1978.

See also, 8798, 8828, 8832, 9079, 9080, 9081, 9086, 9090, 9095, 9096, 9099, 9135, 9149, 9159, 9235.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

9174 WHEN CHOLECYSTECTOMY? (Eng.) Naitove, A. (Dartmouth Medical Sch., Hanover, NH). *Hosp. Pract.* 13(6):121-128; 1978.

Factors that should be considered in determining which patients should undergo cholecystectomy are discussed. Acutely ill patients with an increased risk of operative mortality should avoid cholecystectomy. In patients with classic symptoms of chronic cholecystitis and radiologically demonstrated gallstones or a nonfunctioning gallbladder, elective cholecystectomy should be carried out provided there are no medical contraindications (including those imposed by old age). Previous studies have shown that severe complications (acute cholecystitis, cholangitis, jaundice, pancreatitis) occur in these patients when surgery is not carried out. Observation of asymptomatic or very mildly symptomatic patients has shown that gallbladder disease often does not progress in a predictable way from asymptomatic to mildly symptomatic to severely symptomatic to complicated; many patients are symptom-free from the initial diagnosis by cholecystography until the day a complication appears. The author's experience suggests that patients with symptoms of cholelithiasis that cannot be ascribed to any other cause, but which cannot be explained by any diagnostic procedure, should undergo surgery for suspected occult gallstone disease. Thus, elective cholecystectomy should be carried out in (a) patients with symptoms and radiological evidence of gallstones, (b) asymptomatic patients with radiologic evidence of gallstones, and (c) patients with symptoms but without radiologic evidence of disease. Since acute attacks of cholecystitis will subside in about 75-80% of patients, the primary test is to identify the optimal time for surgical intervention. In patients in whom advanced age is not a factor, in whom the diagnosis of acute cholecystitis is relatively certain, and for whom cholecystectomy is the inevitable choice of definitive treatment, operation should often be performed after 2 or 3 days of hospitalization and medical management. For older patients who may have other debilitating diseases or for those in whom further diagnostic workup is indicated, elective surgery 6-8 weeks later may be preferable. In patients in whom symptoms either do not improve or worsen during the first 48 hr after the onset of symptoms, emergency surgery is indicated.

9175 BACTERIAL FLORA OF THE SMALL INTESTINE AND BILE ACID METABOLISM IN PATIENTS WITH HEPATICO-JEJUNOSTOMY ROUX-EN-Y. (Eng.) Nielsen, M. L.; Justesen, T.; Lenz, K.; Nielsen, O. V.; Jensen, S. L. (31 Sofievej, DK-2900 Hellerup, Denmark). *Scand. J. Gastroenterol.* 12(8):977-982; 1977.

To determine whether ascending biliary tract infection from an intestinal blind loop with bacterial overgrowth could result in the polymicrobial flora seen in the bile of patients with hepaticojejunostomy, duodenal and jejunal bacterial flora and bile acid metabolism were investigated in 14 patients with Roux-en-Y hepaticojejunostomy. Duodenal aspirates were normal in seven patients, whereas abnormal bacterial flora were found in the other seven. The jejunal aspirate, taken in the most proximal part of the jejunum at the site of the entero-entero anastomosis, was normal in only one patient. The difference between the number of abnormal duodenal and abnormal jejunal aspirates was significant ($p<0.05$). Total bile acid concentrations in jejunal aspirates at the anastomosis were low in half the patients (<5 mM). Free (deconjugated) bile acids were found in only one patient, and only trace amounts were present. Free bile acids and an elevated glycine/taurine ratio (6.8) were found in one patient each. The 1-^{14}C-cholyl-glycine breath test was abnormal (>3% of dose expired as $^{14}CO_2$) in five patients, and abnormal ^{14}C output in stools (>5%) was observed in three patients. It is concluded that Roux-en-Y hepaticojejunostomy causes abnormal bacterial flora in the proximal jejunum of almost all patients, whereas alterations in bile acid metabolism are less frequent.

9176 INVESTIGATIONS ON ALBUMIN EXCRETION BY THE LIVER INTO THE BILE. I. POSTOPERATIVE ALBUMIN EXCRETION INTO THE T-DRAINAGE BILE. (Ger.)

Rogos, R. (Kreiskrankenhaus, Leipziger Str. 55, DDR-74 Altenburg, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 38(1):21-26; 1978.

The albumin level was determined by radial immunodiffusion and disc electrophoresis in 134 T-drain bile samples from 62 patients who underwent surgery for cholelithiasis, choledocholithiasis, cholecystitis, and cholangitis. The albumin concentration in the bile of these patients averaged 83.3 ± 61.2 mg/100 ml on postoperative day 1, 37.2 ± 34.7 mg/100 ml on day 3, and 23 ± 22.8 mg/100 ml on day 5. The albumin excretion rate was 228.8 ± 191.1 mg/day on day 1, 118.0 ± 96.7 mg/day on day 3, and 86 ± 86.2 mg/day on day 5. Albumin accounted for 41.8% of the total protein on day 1, for 39% on day 3, and for 40.8% on day 5. Compared with a normal albumin catabolism of 12 g/day, the postoperative albumin loss in the T-drain bile is negligible.

9177 EXCRETION OF METRONIDAZOLE IN HUMAN BILE: INVESTIGATIONS OF HEPATIC BILE, COMMON DUCT BILE, AND GALLBLADDER BILE. (Eng.)

Nielsen, M. L.; Justesen, T. (31 Sofievej, DK-2900 Hellerup, Denmark). *Scand. J. Gastroenterol.* 12(8):1003-1008; 1977.

To investigate the possible value of metronidazole (MNZ) in the treatment of biliary tract infections, MNZ excretion after i.v. injection (500 mg) was studied during surgery in 11 patients without biliary tract disease, 17 patients with gallstones with a normal common duct and normal gallbladder function, 22 patients with gallstones with a normal common duct and loss of gallbladder function, and 5 patients with common duct stones, common duct obstruction, and jaundice. Excretion of MNZ (2 g, p.o.) in hepatic bile was also determined in three other patients following surgery; MNZ appeared rapidly in hepatic bile, and throughout the 17-hr observation period almost identical concentrations of MNZ were found in serum and hepatic bile. In the patients with a normal biliary tract given an i.v. MNZ injection, significantly higher concentrations of MNZ were found in gallbladder bile than in serum ($p<0.01$). In patients with gallstones and preserved gallbladder function, no differences were found between the MNZ concentrations in the serum, common duct bile, and gallbladder bile. In patients with gallstones and loss of gallbladder function, no differences were found between the MNZ concentrations in the serum and in common duct bile, whereas the MNZ concentration in gallbladder bile was significantly lower than that in the serum and common duct bile ($p<0.01$). When MNZ concentrations in gallbladder bile were compare significant ($p<0.01$) differences were found between all three groups of patients: the highest concentrations were found in normal gallbladders and the lowest concentrations were found in nonfunctional gallbladders. In 9 of 14 patients with a blocked cystic duct, no MNZ was detected in gallbladder bile and in the remaining 5 patients, a concentration of 43-63% of the MNZ in serum was found. Thus, MNZ concentrations in gallbladder bile were significantly ($p<0.01$) lower than MNZ concentrations in both serum and common duct bile, whereas no significant difference was found between serum and common duct bile. In eight patients with a patent cystic duct, no significant differences were found between MNZ concentrations in serum, common duct bile, and gallbladder bile. Common duct bile MNZ concentrations in the patients with common duct obstruction varied from 56% to 99% of the corresponding serum MNZ concentration. I.v. MNZ would be useful in the chemotherapy of cholangitis.

9178 CARCINOMA OF THE PAPILLA OF VATER: A REVIEW OF FIFTY-SEVEN CASES. (Eng.)

Schlippert, W.; Lucke, D.; Anuras, S.; Christensen J. (Dept. Medicine, Univ. Iowa, Iowa City, IA 52242). *Am. J. Surg.* 135(6):757-762; 1978.

Experience with 57 cases of carcinoma of the papil of Vater are reviewed to determine the relative success of various kinds of surgery and to define those clinical characteristics that suggest the diagnosis and that correlate with survival, papilliation, and cure. The relative frequencies for both pancreatic and papillary malignancies increas little since 1940, with approximately 13-16 cases of pancreatic malignancy occurring for each case of papillary tumor. The most common presenting complaints were weight loss in 94% and jaundice in 91%. Hepatic enlargement was discovered on physical examination in 64%. Of 47 upper gastrointestinal contrast studies, 26 were interpreted as normal. The 21 abnormal results included abnormalities of the second part of the duodenum in 12 patients, extrinsic pressure on the stomach or duodenum in 5, the "inverted three" sign in 1, and partial duodenal obstruction by an annular lesion in 1. Endoscopic retrograde chola giopancreatography confirmed the diagnosis in the two patients in whom it was carried out. Percutaneous transhepatic cholangiography was performed in three patients and was abnormal in all, but celiac angiography was noncontributory in the two patients in whom it was performed. Local resection was carried out in seven patients. One patient is alive and well 12 yr after resection, and another died during the immediate postoperative period; the mean survival in the remaining cases was 21.3 ± 2.0 months (range 1.5-58 months). No metastases were found at the time of resection in any of these seven cases. A bypass procedure was performed initially in 16 patients. Metastases were noted in six cases. There were three operative deaths, and the mean survival of the remaining patients was 13.1 ± 1.3 months (1.5-41 months). A Whipple operation was performed initially in 31 patients, and metastases were found in 9 cases. There were seven operative deaths. Three patients are still alive 6, 6, and 84 months postoperatively. Two patients died of unrelated diseases. Mean survival excluding two current survivors whose survival is less than the median was 24.1 ± 1.2 months (11-53 months). When patients with metastases were considered separately, those who had a Whipple operation survived significantly longer than those who had a bypass operation ($p<0.05$). The Whipple procedure is probably the better operation for carcinoma of the papilla of Vater. Local resection in the absence of metastases offers a chance for cure and a survival rate that do not differ from those of the Whipple operation, although 50% of the cases in this series who underwent resection needed subsequent palliative surgery.

9179 CARCINOMA ARISING IN A CONGENITALLY DILATED BILIARY TRACT: REPORT OF A CASE AND REVIEW OF THE LITERATURE.

(Eng.) Kagawa, Y.; Kashihara, S.; Kuramoto, S.; Maetani, S. (Tenri Hosp., Tenri, Nara, Japan). *Gastroenterology* 74(6): 1286-1294; 1978.

The case of a patient with carcinoma arising in a congenitally dilated biliary tract is reported, and the 47 cases in the world literature are reviewed. The patient was a 57-yr-old woman with a 5-yr history of episodes of characteristic symptoms of cholangitis. Endoscopic retrograde cholangiopancreatography disclosed a markedly dilated common duct, 20 mm in diameter in the intrapancreatic portion and 40 mm in the supraduodenal portion. The upper part of the common duct and the gallbladder were not fully visualized because of incidental incompetence of Oddi's sphincter. Percutaneous transhepatic cholangiography revealed dilated intrahepatic ducts and obstruction near the confluence of the hepatic ducts. Selective angiography revealed irregularity and tumor stain of the branches of the hepatic artery, which derived from the superior mesenteric artery. At surgery, the gallbladder was distended, and the common duct was dilated, having a diameter of 50 mm; neither contained stones. A papillary tumor was found filling the common bile duct lumen. Biopsy of the lesion confirmed papillary adenocarcinoma. The common duct, common hepatic duct, gallbladder, and regional lymph nodes were resected, and Roux en-y hepaticojejunostomy was performed at the bifurcation of the hepatic ducts. The patient has been asymptomatic for 30 months postoperatively. Drip infusion cholangiography at 4 and 10 months after surgery revealed dilated intrahepatic ducts. There was no evidence of obstructive jaundice, indicating that the dilatation of the intrahepatic ducts was congenital and not secondary to obstruction. A review of the literature suggests that the association of carcinoma with congenital biliary ductal dilatation is more frequent than is commonly recognized. Carcinoma may arise in either the extrahepatic or intrahepatic ducts. Primary excision of choledochal cysts is advisable, to prevent the risk of later malignant change.

9180 LIPOPROTEIN METABOLISM IN CHOLESTASIS.

(Ger.) Patsch, W. (Medizinische Universitatsklinik, Anichstrasse 35, A-6020 Innsbruck, Austria). *Acta Med. Austriaca* 4(Special Issue): 86-87; 1977.

The relationships between lipoprotein-X (LP-X) and lecithin cholesterol acyltransferase (LCAT) activity were studied in three patients following the surgical removal of bile flow obstruction. The LCAT activity reached 3-4 times the normal value on the 4th postoperative day, while the concentration of LP-X_2, decreased rapidly. On the 6th postoperative day, the concentration of LP-X, also decreased rapidly. When LP-X_1 and LP-X_2 were incubated separately in normal plasma at 37 C, the half-life of LP-X_1 was 24 hr and that of LP-X_2 9.5 hr; the difference may be due to different apolipoprotein levels in the two compounds. During the reduction of the LP-X concentration in the medium, there appeared a high-density lipoprotein (HDL_2), which suggests that the decomposition of LP-X is mediated by an acyltransferase. The findings indicate the existence of a relationship between LP-X and LCAT.

9181 INDUCTION OF BILE ACID GLUCURONIDE FORMATION IN CHILDREN WITH INTRAHEPATIC CHOLESTASIS.

(Eng.) Frohling, W.; Stiehl, A.; Czygan, P.; Liersch, M.; Kommerell, B.; Rotthauwe, H. W.; *et al. In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 101-104; 1977.

The effect of phenobarbital on intrahepatic cholestasis was reevaluated in three children with intrahepatic cholestasis, with special regard to a possible induction of bile acid glucuronide formation. The patients were treated with 0.1-0.14 g phenobarbital daily for at least 14 days. Phenobarbital caused an improvement of cholestasis, the disappearance of jaundice, and a decrease in serum bile acid concentrations of 60% (from 119 to 41 µg/ml) in all patients; nonsulfated, nonglucuronidated bile acids and bile acid sulfates were markedly reduced, whereas the decrease of glucuronides was much smaller (glucuronides accounted for 14% of the serum bile acids before treatment and for 27% after treatment). Biliary bile acid excretion increased by 47% (78% for nonsulfated, nonglucuronidated bile acids, 62% for sulfates). Bile acid glucuronides increased by 122%, accounting for 12% of the bile acids before treatment and for 18% after treatment. The percentage of glucuronides of the different bile acids in bile ranged from 12-29% before treatment and was increased by phenobarbital for all bile acids investigated. Remarkably high rates of bile acid glucuronides, accounting for 40-60% in two children, were found for Δ-5-cholenic acid and lithocholic acid after treatment, suggesting a correlation between extensive glucuronidation and the disappearance of these highly toxic bile acids after phenobarbital treatment. Bile acid sulfate excretion in bile decreased after phenobarbital; 25% of bile acids were sulfated before treatment and 6% after treatment. Urinary bile acid excretion decreased by 45% after treatment, due to the lowered serum bile acid concentrations. Sulfated and nonsulfated, nonglucuronidated bile acids were similarly reduced, whereas the excretion of glucuronides increased by 136%. The alteration in the bile acid pattern after phenobarbital, with an increase in the percentage of serum, bile, and urinary bile acid glucuronides and an increase in the absolute amounts of glucuronides excreted in bile and urine, strongly suggests an increased formation of bile acid glucuronides after phenobarbital treatment.

9182 CONGENITAL CYSTIC DILATATION OF THE INTRA- AND EXTRAHEPATIC BILIARY TRACT.

(Fre.) Bloch, P.; Dimitrov, N.; Eidesheim, D.; Clavert, A.; Christmann, D.; Kim, K.; *et al.* (Service de Radiologie, C.H.U. F67005 Strasbourg Cedex, France). *J. Radiol. Electrol. Med. Nucl.* 58(12):839-840; 1977.

A case of a cystic dilatation of the intra- and extrahepatic biliary tract in a 12-yr-old girl is reported. She was hospitalized for a painful abdomen syndrome that was diagnosed as acute pancreatitis. Her past medical history included an episode of icterus at the age of 4 yr and two other hospitalizations for painful abdomen. No abdominal mass was palpated. X-rays showed an enlargement of the retrogastric space and compression of the stomach. I.v. cholangiography revealed the cystic dilatation of the biliary tract. At surgery, the latter diagnosis was confirmed and two cysts were found, one a 5-cm cyst of the gallbladder and the other a cyst of the common hepatic duct. The pancreas was hard and enlarged, which accounted for the enlargement of the retrogastric space. The long-term results of surgical treatment have been excellent.

9183 MIRIZZI'S SYNDROME AS A SPECIAL FORM OF OBSTRUCTIVE JAUNDICE.

(Ger.) Heil, T.; Belohlavek, D. (Zentrum fur Operative Medizin der Universitat, Steinhovelstrasse 9, D-7900 Ulm/Donau, W. Germany). *Chirurg* 49(1):57-59; 1978.

Mirizzi's syndrome (isolated stenosis of the hepatic duct) was diagnosed in three patients. Recurrent fever and right epigastric pains were the first symptoms. Two patients had jaundice. Endoscopic retrograde cholangiography was performed in two cases; it demonstrated Mirizzi's syndrome in both. Gallstones were found in the cystic duct in two patients and in the gallbladder in the third.

9184 HEPATIC NECROSES AFTER INFUSION CHOLANGIOGRAPHY.

(Ger.) Winckler, K. (Abteilung fur Gastroenterologie und Stoffwechselkrankheiten, Medizinische Universitatsklinik, Robert-Koch-Str. 40, 3400 Gottingen, W. Germany). *Dtsch. Med. Wochenschr.* 103(10):420-424; 1978.

Ten episodes of massive increase of transaminase levels accompanying liver necrosis were observed in seven patients (1 each with biliary tract disease, recurrent pancreatitis, cholelithiasis, hyperlipemia and minimal toxic liver damage, pyelonephritis, arteriitis, and pseudolupus erythematosus) following infusion of megluminioglycamide (Biligram; 10 ml in 5 cases, 200 ml in 2). In six patients, there was an increased alkaline phosphatase level without jaundice before the investigation, and a slight increase in the transaminase levels in three. After Biligram infusion, there was an abrupt increase in the SGPT level (range 98-2,202 U/1), and a lesser increase in the SGOT level, but the alkaline phosphatase level showed no major change. Abdominal pain, fever, erythema, or conjunctivitis were seen in three patients. Histologically, all patients showed centrilobular necrosis. Transaminase levels should be checked 2 days after infusion cholangiography; in patients showing definite increase, reexposure to the contrast agent should be avoided.

9185 BILE-DUCT OBSTRUCTION IN A 39-YEAR-OLD MA

(Eng.) Burhenne, H. J.; Galdabini, J. J. (Massachusetts General Hosp., Boston, MA). *N. Engl J. Med.* 297(19):1054-1059; 1977.

The case of a patient with bile duct obstruction and a discussion of the differential and clinical diagnosis are presented. The patient developed jaundice 1 week after receiving halothane anesthesi for herniorrhaphy. An ultrasound study demonstrate distended intrahepatic bile ducts. Upper gastrointestinal series and hypotonic duodenography helped rule out an obstructing pancreatic lesion. Endoscopic retrograde cholangiopancreatography revealed complete obstruction of the common hepatic duct 1 cm proximal to the insertion of the cystic duct. The contrast column at the point of obstruction showed a smooth, conical narrowing. Distal to the obstructed area, the common hepatic and common bile ducts appeared normal in caliber an contour, and the main pancreatic duct appeared normal. A ^{99m}Tc-sulfur colloid liver-spleen scan demonstrated nonhomogeneous activity throughout th slightly enlarged liver. The spleen was slightly enlarged, with relatively increased uptake. No marrow uptake was identified. Selective superior mesenteric and hepatic angiography disclosed that the hepatic artery was a branch of the superior mesenteric artery; the major branches of the superior mesenteric artery were patent, and films obtained during the venous phase were normal. There was a slightly nonhomogeneous hepatographic phase suggestive of dilatation of the biliary radicles. No tumor blush or abnormal vascularity was observed, and the portal vein was patent. Fine-needle transhepatic cholangiography revealed multifocal concentric narrowing of major hepatic ducts in the region of the porta hepatis, with dilatation of secondary intrahepatic radicles. Combining the findings from the retrograde study, the scan, and angiography led to the conclusion that there was a small mass in the porta hepatis above he neck of the gallbladder. Percutaneous transepatic cholangiography was the most diagnostic, showing the lesion from two sides. The preoperative diagnosis was an obstructing carcinoma t the porta hepatis, probably a cholangiocarcinoma. t exploration, a small tumor involving the proximal ortion of the common hepatic duct and extending p into the liver was found. Frozen-section examiation of the wedge-biopsy specimen revealed cords f tumor cells that had formed tubules with mucin ecretion. Cholestasis and bile duct proliferation ere observed in the adjacent liver. The anatomical iagnosis was adenocarcinoma of the hepatic ducts t the junction with the common hepatic duct.

186 BILE DUCT INJURIES FROM NON-PENETRATING ABDOMINAL TRAUMA IN CHILDHOOD. (Eng.) hmed, S. (Adelaide Children's Hosp., 72 King Wiliam Rd., North Adelaide, South Australia 5006, ustralia). *Aust. N.Z. J. Surg.* 46(3):209-212; 1976.

he cases of three children with bile duct injuries rom nonpenetrating abdominal trauma are presented. he first patient, a 2.5-yr-old girl, was admitted ith vomiting of bile-stained fluid. She was pale nd dehydrated, with multiple bruises, and was hought to be a battered baby. Abdominal signs ere equivocal, and initially she was managed conervatively, but on the 3rd day of hospitalizaion, she had signs of peritonitis. Surgical exloration revealed peritonitis and transection of he common bile duct. Continuity was established y performing a choledochoduodenostomy over a T-ube inserted through the common bile duct. The nd of the transected duct was sutured to the dudenal mucosa. A drain was placed to the site of nastomosis, and the wound was closed. The second atient was a 6-yr-old boy who presented with upper bdominal pain, vomiting, increased pulse rate, nd a blood pressure of 90/55 mm Hg after being it by a car. Abdominal tenderness, rigidity, and bsent bowel sounds were observed. At emergency aparotomy, a laceration of the inferior surface f the liver and transection of the common bile uct, which was identical with that in the first atient, were discovered. Choledochoduodenostomy as performed, and the surgical technique described n the first patient was adopted; this time, howver, the T-tube was inserted through the duodentomy. The third patient, a 5-yr-old girl who had been hit by a truck, presented with abdominal tenderness, rigidity, and absent bowel sounds. At surgery, a liver laceration and perforation in the common hepatic duct were found. The duct was not sutured, and a large drain was left *in situ*. All patients made satisfactory recoveries. Bile duct injuries due to nonpenetrating trauma present urgently when associated with liver laceration or other abdominal visceral injuries. When the duct injury is an isolated one, the ensuing clinical picture may be insidious. Surgical management is aimed at early recognition of the injury, followed by reconstruction of the biliary tract.

9187 RESULTS OBTAINED WITH AND INDICATIONS OF CHENODEOXYCHOLIC ACID IN THE TREATMENT OF CHOLELITHIASIS [Abstract]. (Fre.) Metreau, J. M.; Dhumeaux, D. (Hopital Henri-Mondor, 94010 Creteil, France). *Therapie* 32(4):407; 1977.

9188 COOPERATIVE TRIAL OF CHENODEOXYCHOLIC ACID APPLIED IN DIFFERENT DOSES IN CHOLESTEROL CHOLELITHIASIS. (Fre.) Bermann, C.; Betourne, C.; Brette, R.; Chaput, J. C.; Debray, C.; Etienne, J. P.; *et al.* (No affiliation given). *Gastroenterol. Clin. Biol.* 1(11):960; 1977.

9189 TREATMENT OF CHOLESTEROL CHOLELITHIASIS WITH β-SITOSTEROL: CONTROLLED THERAPEUTIC TRIAL. (Fre.) Marteau, C.; Reynier, M. O.; Mathieu, S.; Mule, A.; Crotte, C.; Gerolami, A.; Sarles, H. (Unite de Recherches de Pathologie Digestive, INSERM, U-31, 46, chemin de la Gaye, 13009 Marseille, France). *Gastroenterol. Clin. Biol.* 1(8/9):716; 1977.

9190 DIVERTICULUM OF THE COMMON BILE DUCT. (Ger.) Schwegler, N. (Kantonsspital Basel, Basel, Switzerland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):235-236; 1978.

9191 THE "SHORT" COMMON BILE DUCT: AN ATTEMPT AT SYSTEMATIZATION. (Fre.) Salembier, Y. (Cite Hospitaliere, 3e Est, F 59000 Lille, France). *Nouv. Presse Med.* 6(33):2977-2984, *passim;* 1977.

9192 GALLBLADDER INSERTED IN THE COMMON HEPATIC DUCT: A RARE ANOMALY OF THE BILE DUCTS (Ger.) Zimmermann, H. G. (Allgemeines Krankenhaus Hamburg-Barmbeck, Rubenkamp 148, D-2000 Hamburg 60, W. Germany). *Chirurg* 48(2):73-76; 1977.

9193 USE OF TETRACYCLINES IN BILIARY DISEASES: ASSESSMENT BY THE DETERMINATION OF SERUM AND TISSUE LEVELS. (Ger.) Pelz, K.; Herdter, F.; Marcushen, M. (Klinikum der Albert-Ludwigs-Universitat, Postfach 820, 7800 Freiburg i. Brsg., W. Germany). *Therapiewoche* 27(47):8585-8591, *passim;* 1977.

9194 CHOLERETIC ACTIVITY OF PROBILIN® IN MATCHED DOUBLE-BLIND TRIAL AFTER CHOLECYS-

TECTOMY. (Ger.) Mestrovic, N. J. (St. Markus-Krankenhaus, 5300 Bonn-Bad Godesberg, W. Germany). *Therapiewoche* 27(35):6077-6083, *passim;* 1977.

9195 MANAGEMENT OF HIGH OBSTRUCTIONS OF THE BILE DUCTS BY THE RODNEY-SMITH METHOD. (Ger.) Botticher, R.; Gauger, U. (Chirurgische Universitatsklinik, Krankenhausstrasse 12, D-8520 Erlangen, W. Germany). *Chirurg* 48(7):444-447; 1977.

9196 ERRORS IN BILE DUCT SURGERY. (Rus.) Avdei, L. V.; Matuzov, L. Z. (Second Clinic Hosp. Surgery, Minsk Medical Inst., Minsk, USSR). *Khirurgiia (Mosk.)* (7):134-138; 1977.

9197 RESULTS OF A NONCONTROLLED COOPERATIVE TRIAL OF CHENODEOXYCHOLIC ACID IN THE TREATMENT OF CHOLELITHIASIS. (Fre.) Bernades, P.; Bonfils, S.; Bourel, M.; Caulin, C.; Erlinger, S.; Ferrier, J. P.; *et al.* (No affiliation given). *Therapie* 32(4):405; 1977.

9198 GREY SCALE ULTRASONOGRAPHY: EVALUATING THE JAUNDICED PATIENT. (Eng.) Zusmer, N. R.; Harwood, S. J.; Pevsner, N. H.; Janowitz, W. R.; Serafini, A. N. (Univ. Miami Sch. Medicine, P.O. Box 520875, Miami, FL 33152). *South. Med. J.* 71(5):498-501; 1978.

9199 PERFORATED CHOLEDOCHAL CYST IN CHILDREN. (Eng.) Todani, T.; Tabuchi, K.; Watanabe, Y.; Nabeyama, A.; Emoto, T.; Munetomo, Y. (Okayama Univ. Medical Sch., 2-5-1 Shikatacho, Okayama City 700, Japan). *Z. Kinderchir.* 23(3):280-286; 1978.

9200 THE VALUE OF GRAY SCALE ULTRASOUND IN THE DIFFERENTIAL DIAGNOSIS OF SURGICAL AND NONSURGICAL JAUNDICE. (Eng.) Sabel, J. S.; Graham, D. Y.; Davis, R. E.; Malini, S. (Ben Taub General Hosp., Houston, TX). *Am. J. Gastroenterol.* 69(2):149-153; 1978.

9201 VALUE OF OPERATIVE CHOLANGIOGRAPHY. (Eng.) Chatterjee, D. K.; Jones, W. M. (Royal Infirmary, Sheffield, England). *Br. J. Clin. Pract.* 32(4):105-106; 1978.

9202 NONOPERATIVE REMOVAL OF RETAINED COMMON-BILE-DUCT STONES. (Eng.) Ho, C. S. (Toronto General Hosp., Toronto, Ontario M5G 1L7, Canada). *Can. J. Surg.* 21(3):244-247; 1978.

9203 CHOLELITHIASIS AND ACOUSTIC SHADOWING. (Eng.) Grossman, M. (Univ. California, Irvine Medical Center, 101 City Drive South, Orange CA 92668). *J. Clin. Ultrasound* 6(3):182-184; 1978.

9204 NON-OPERATIVE REMOVAL OF RETAINED STONES IN THE COMMON BILE DUCT. (Eng.) Rees, B. I.; Lawrie, B. W. (Dept. Surgery, Univ. South Wales, Wales). *Br. J. Surg.* 65(5):334-336; 1978.

9205 BILE COMPOSITION AND DEPOSITION OF CALCIU CARBONATE IN GALLSTONES [Abstract]. (Eng Sutor, D. J.; Wilkie, L. I.; Clark, C. G. (Dept. Chemistry, Univ. Coll. London, London, England). *Gut* 18(5):A402; 1977.

9206 CHOLEDOCHOSCOPY IN DISEASES OF THE SPHINC TER OF ODDI. (Eng.) Vosse, A. *In: The Sphincter of Oddi. Proceedings of the Third Gastro intestinal Symposium, Nice, June 8-9, 1976.* (Basel S. Karger): 120-122; 1977.

9207 PEROPERATIVE ENDOSCOPIC EVALUATION OF THE DISTAL BILE DUCT. (Eng.) Fourtanier, G. Escat, J.; Lacroix, A. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposiu Nice, June 8-9, 1976.* (Basel: S. Karger): 43-44 1977.

See also, 8713, 8722, 8784, 8785, 8787, 8792, 8793 8794, 8800, 8801, 8809, 8813, 8815, 8816 8860, 8879, 8907, 8944, 9038, 9063, 9066 9067, 9071, 9075, 9103, 9244.

GENERAL

9208 VERNER-MORRISON SYNDROME: CLINICAL STUDY. (Fre.) Dupuy, R. (Hopital Beaujon, 100, av. du General-Leclerc, 92110 Clichy, France). *Ann. Gastroenterol. Hepatol.* 13(6):599-605; 1977.

The Verner-Morrison (V-M) syndrome that accompanies a tumor of the Langerhans' cells of the pancreas is reviewed. The tumor is the rarest of the pancreatic tumors and, since a report of 64 cases published in 1974, not many more have been added to the literature. The average age of patients with this tumor is 47 yr with an age range of 17-72 yr. The tumor secretes a hormonal factor that induces intestinal peristalsis, causing symptoms of abundan aqueous diarrhea. The diarrhea is accompanied by hypokalemia of 3.6-1.2 mEq and hypochlorhydria in 50% of the patients. Differential diagnosis o the V-M syndrome from Zollinger-Ellison disease i established by the ulcer and hyperchlorhydria in the latter and from carcinoids by the hypotension

d severe flushing of the skin in the latter. In
-35% of the V-M syndrome patients, a malignant
mor is responsible for the disease, and prog-
sis is poor; the cause of the V-M syndrome
; a benign adenoma of the pancreas in 41%
 the patients and pancreatic hyperplasia
 the remainder. Absence of a malignant tumor is
t an assurance of a good prognosis, since one-
ird of the patients with adenomas die of renal
sufficiency related to hypokalemia. Early di-
nosis and surgical excision of a malignant tumor
 subtotal pancreatectomy with restoration of the
ectrolyte balance with a benign tumor or hyper-
asia are the recommended treatments.

209 VERNER-MORRISON SYNDROME: MORPHOLOGICAL DATA DERIVED FROM HISTOENZYMOLOGY AND
STOIMMUNOLOGY. (Fre.) Martin, E. D.; Galain, A.;
otto, J.; Leclerc, J. P.; Ganter, P. (Hopital
toine-Beclere, 157, rue de la Porte-de-Trivaux,
141 Clamart, France). *Ann. Gastroenterol. Hepatol.*
(6):615-627; 1977.

 the basis of 91 cases of the Verner-Morrison
-M) syndrome (4 new cases, 87 from the litera-
re), the epidemiological, histological, physio-
gical, and immunological aspects of the syndrome
e reviewed. Both sexes are equally likely to
velop the V-M syndrome; the age range is 17-78 yr
th an average age of 46 yr. The V-M syndrome is
used by a tumor of the pancreas that is larger
an 3 cm in 78% of the patients. The tumor is
lignant in 62.5% of the patients; otherwise the
ndrome may be induced by an adenoma, polyadeno-
tosis, or hyperplasia of the pancreas. No ectopic
mors have been identified. Criteria for malig-
ncy are not based on cytological characteristics
nce the tumor cells are almost always regular
th little evidence of mitoses; it is based on the
esence of intravascular emboli and hepatic or
mph node metastases. Ultrastructural studies,
rformed in 17 cases reported in the literature and
 3 in the present series, show two populations of
cretory granules: one about 300 nm in diameter
d the other about 625 nm. Histochemical immuno-
uorescence studies reveal the presence of a vaso-
tive intestinal polypeptide (VIP) that has also
en found in bronchial carcinomas, a pheochromocy-
ma, and two ganglioneuroblastomas. In 50% of
mors in V-M patients, another hormone, the human
ncreatic hormone (HPP), has been found associ-
ed with VIP. The presence of VIP in tumors known
 be of nerve tissue origin may be evidence for
e neuroectodermal origin of the tumor cells that
use the V-M syndrome.

10 SECRETIN AND THE ZOLLINGER-ELLISON SYNDROME: RELIABILITY OF SECRETIN TESTS
) PATHOGENETIC ROLE OF SECRETIN. (Eng.) Stage,
 G.; Stadil, F.; Rehfeld, J. F.; Fahrenkrug, J.;
haffalitzky de Muckadell, O. B. (H. C. Andersens
vd. 47, 1553 Copenhagen V, Denmark). *Scand. J.*
stroenterol. 13(4):501-511; 1978.

 establish the reliability of secretin tests in
e diagnosis of the Zollinger-Ellison syndrome
(ZE), the effects of an i.v. infusion (1 clinical U (CU)/kg/hr) or injection (1 CU/kg) of secretin on serum gastrin concentrations were compared in 25 hypersecretors with verified ZE and in 19 patients with duodenal ulcer disease. Secretin infusion raised the serum gastrin levels in the ZE patients. The increase appeared within 15 min and lasted until termination of the infusion. The peak value of 128 ± 13.1% of basal (p=0.01) was reached after 30 min. In ulcer patients, the serum gastrin concentration increased only after termination of the infusion (to 120.5 ± 8.5% of the basal level, p<0.05). Differences in the serum gastrin level during infusion between the ZE and ulcer patients were not significant, but the levels 5 min after an i.v. bolus injection were significantly different (238 ± 40% and 132 ± 12% of the basal level in ZE and ulcer patients, p<0.01 and p<0.05, resp.). However, not all ZE patients responded to the injection, and there were overlapping results in the two groups of patients both after infusion and after bolus injection. Pre- and postoperative studies showed that total gastrectomy did not influence either the gastrin response to secretin or the serum gastrin level. Serum gastrin corresponded to the four gastrin components I-IV. No changes in the gastrin component pattern occurred after secretin administration in any patient. The serum secretin concentrations in 11 fasting unoperated patients and 5 gastrectomized ZE patients tested (5.6 ± 0.75 and 2.2 ± 0.8 pM, resp.) were higher than in 74 normal subjects (1.4 ± 0.2 pM, p<0.001). This result does not support the hypothesis that secretin release by acid entering the duodenum drives the gastrin release from gastrinomas, since exogenous secretin often failed to raise the serum gastrin concentration and since serum gastrin concentrations did not decrease after total gastrectomy. Because of the failure of some ZE patients to respond to the secretin test, a positive result is not sufficient to establish the diagnosis of ZE. The secretin test appears to have limited diagnostic value in ZE patients.

9211 REPORT ON THE UNITED STATES EXPERIENCE WITH CIMETIDINE IN ZOLLINGER-ELLISON SYNDROME AND OTHER HYPERSECRETORY STATES. (Eng.) McCarthy, D. M. (Natl. Inst. Arthritis, Metabolism and Digestive Diseases, Bldg. 10, Rm. 9D-15, Natl. Inst. Health, Bethesda, MD 20014). *Gastroenterology* 74(2, Part 2):453-458; 1978.

Experience with cimetidine in the treatment of 61 patients with the Zollinger-Ellison syndrome, encountered over a 2-yr period, is presented. Half the patients have been treated for over 1 yr. Two-thirds of the patients responded to 300 mg of the drug p.o. every 6 hr; others required up to 600 mg every 6 hr. In adequate doses, the drug was highly effective; it controlled pain and dyspepsia, restored weight, abolished diarrhea, and allowed healing of ulcers and other inflammatory conditions. Missed or reduced doses led to rapid return of symptoms. Progression of the basic neoplastic process, with associated secretory drive, was unimpeded. Patient acceptance of the drug was 100%, and apart from minor transient abnormalities, gynecomastia (5 cases) and liver dysfunction (3 cases), which resolved while treatment continued, no serious adverse effects were seen. Of 61 patients, 48 are still on the drug, 3 who were well controlled were also treated surgically, 5 died for reasons unrelated to therapy, and 5 had significant problems. The drug provides an alternative to total gastrectomy and can be recommended with confidence for the suitably selected patient.

9212 HISTOLOGICAL, HISTOENZYMOLOGICAL AND ULTRAMICROSCOPIC ASPECTS OF PANCREATIC TUMORS IN ZOLLINGER-ELLISON SYNDROME. (Fre.) Potet, F. (Hopital Beaujon, 100, bd du General-Leclerc, 92110 Clichy, France). *Ann. Gastroenterol. Hepatol.* 13(6):591-597; 1977.

Histological, histoenzymological, and ultramicroscopic features of the pancreatic tumors causing the Zollinger-Ellison (ZE) syndrome are discussed. The histochemical behavior of the tumor does not always parallel that of the gastrin cell from which it has been thought to arise. Characteristically, the gastrin cell shows argyrophilia by the methods of Grimelius and Sevier-Munger, fluorescence when exposed to formol, metachromasia with toluene blue at pH 5.5, and hematoxyline reaction with lead. The reaction found most consistently is argyrophilia, which identifies tumor cells with an endocrine origin. Ultrastructurally, the granulation typical of the gastrin cell is not observed in the pancreatic tumors. Unlike the normal gastrin cell, granules in the tumor cells are of variable density, irregular size, and not abundant. Immunochemically, the tumor cells react like the gastrin cells, since they react with antiserum marked with the isothiocyanate of fluorescein (indicating the presence of gastrin). In 20% of cases, there are two, three, or more types of secretions present, but secretion of gastrin predominates. The histogenesis of the tumors that cause the ZE syndrome is not well understood.

9213 NEW DATA ON METHODS FOR MORPHOLOGICAL EXAMINATION OF PANCREATIC GROWTHS IN ZOLLINGER-ELLISON SYNDROME. (Fre.) LaMarque, J. L.; Bruel, J. M.; Dondelinger, R.; Polge, D. (Hopital Saint-Eloi, 34059 Montpellier Cedex, France). *Ann. Gastroenterol. Hepatol.* 13(6):579-590; 1977.

Diagnosis by conventional x-ray and angiographic examinations of the pancreatic tumors that cause the Zollinger-Ellison (ZE) syndrome is discussed. The cause of the ZE syndrome is a small pancreatic tumor, often multiple, sometimes reduced to simple hyperplasia. The criteria for malignancy of these tumors is the presence of hepatic metastases. The metastases are highly vascular and can be readily diagnosed by selective angiography of the splenic and superior mesenteric veins. In the absence of hepatic metastases, the pancreatic tumors can be identified more readily if they are highly vascular. Selective arteriography of the gastroduodenal and dorsal pancreatic arteries will show the hypervascular pancreatic tumors. In the 20% of pancreatic tumors that are not highly vascular, diagnosis must be made by indirect signs such as compression of arteries and veins and lacunar x-ray images of the body of the pancreas. Usually, only large tumors will produce these signs. The use of sonography, scintigraphy, and tomodensitometry in the diagnosis of pancreatic tumors is also discussed.

9214 VIRUSES AND DIARRHEA--A REVIEW. (Eng.) Steinhoff, M. C. (Univ. Rochester Medical Center, 601 Elmwood Ave., Rochester, NY 14642). *Am. J. Dis. Child.* 132(3):302-307; 1978.

9215 RADIATION THERAPY IN THE TREATMENT OF MALIGNANT SALIVARY GLAND TUMORS. (Eng.) Elkon, D.; Colman, M.; Hendrickson, F. R. (Rush-Presbyterian-St. Luke's Medical Center, 1753 W. Congress Parkway, Chicago, IL 60612). *Cancer* 41(2):502-506; 1978.

9216 ACUTE FOLATE DEFICIENCY ASSOCIATED WITH INTRAVENOUS NUTRITION WITH AMINOACID-SORBITOL-ETHANOL: PROPHYLAXIS WITH INTRAVENOUS FOLIC ACID. (Eng.) Wardrop, C. A. J.; Lewis, M. H.; Tennant, G. B.; Williams, R. H. P.; Hughes, L. E. (Welsh Natl. Sch. Medicine, Heath Park, Cardiff CF4 4XW, Wales). *Br. J. Haematol.* 37(4):521-526; 1977.

9217 DRUG KINETICS AND METABOLISM IN PEM. (Eng.) Anonymous. (No affiliation given) *S. Afr. Med. J.* 53(9):329-330; 1978.

9218 ACQUIRED EVENTRATION OF THE DIAPHRAGM--RESULTS OF SURGERY. (Eng.) Varpela, E.; Laustela, E. V.; Viljanen, A. (Univ. Central Hosp. SF-00290 Helsinki 29, Finland). *Ann. Chir. Gynaec* 66(6):284-289; 1977.

9219 FASTING METABOLISM IN INFANTS. I. EFFE OF SEVERE UNDERNUTRITION ON ENERGY AND PROTEIN UTILIZATION. (Eng.) Kerr, D. S.; Stevens M. C. G.; Robinson, H. M. (Rainbow Babies and Childrens Hosp., 2101 Adelbert Rd., Cleveland, OH 44106). *Metabolism* 27(4):411-435; 1978.

9220 ACINIC CELL CARCINOMA OF SALIVARY ORIGIN A CLINICOPATHOLOGIC STUDY OF 67 CASES. (Eng.) Spiro, R. H.; Huvos, A. G.; Strong, E. W. (Memorial Sloan-Kettering Cancer Center, New York, NY 10021). *Cancer* 41(3):924-935; 1978.

9221 ENTEROTOXIN-PRODUCING *Escherichia coli* AND DIARRHOEA AMONG NEWBORN BABIES IN DARWIN. (Eng.) Luke, R. K. J.; Ryan, N. J.; Bar G. L.; Bishop, R. F.; Dayaratne, R. D. B. (Sch.

Agriculture, La Trobe Univ., Bundoora, Victoria 3083, Australia). *Med. J. Aust.* 1(3):170-171; 1977.

9222 PARVOVIRUS GASTROENTERITIS--A NEW ENTITY FOR AUSTRALIA. (Eng.) Christopher, P. J.; Grohmann, G. S.; Millsom, R. H.; Murphy, A. M. (Western Metropolitan Health Region, New South Wales, Australia). *Med. J. Aust.* 1(3):121-124; 1978.

9223 CHRONIC DIARRHOEAS IN ADULTS. (Eng.) Chatterjee, H. (Sch. Tropical Medicine, Calcutta, India). *J. Indian Med. Assoc.* 69(11):259-261; 1977.

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9227 HUMAN MILK AND GUT INFECTION IN THE NEWBORN. (Eng.) Bullen, J. J. (Natl. Inst. Medical Res., London, England). *J. Appl. Med.* 4(3):193-197; 1978.

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231 ENVIRONMENTAL FACTORS AND THE DEVELOPMENT OF DISEASE AND INJURY IN THE ALIMENTARY RACT. (Eng.) Schedl, H. P. (Univ. Iowa Coll. Medicine, Iowa City, IA 52242). *Environ. Health Perspect.* 20:39-54; 1977.

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9235 PHLEGMONOUS ENTEROCOLITIS. (Eng.) Rosen, Y.; Won, O. H. (Kings County Hosp. Center, 451 Clarkson Ave., Brooklyn, NY 11203). *Am. J. Dig. Dis.* 23(3):248-256; 1978.

9236 A STUDY OF ETIOLOGIC AGENTS IN INFANTILE GASTROENTERITIS. (Eng.) Mundel, G.; Kohn, A.; Yaron, R.; Strossman, Y. (Asaf Harofe Government Hosp., Zerifin, Israel). *Isr. J. Med. Sci.* 14(3):391-394; 1978.

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9238 EVALUATION OF GASTROINTESTINAL MICROFLORA IN NECROTIZING ENTEROCOLITIS. (Eng.) Bell, M. J.; Feigin, R. D.; Ternberg, J. L.; Brotherton, T. (St. Louis Children's Hosp., 500 S. Kingshighway, St. Louis, MO 63110). *J. Pediatr.* 92(4):589-592; 1978.

9239 TRANSIENT STEATORRHEA FOLLOWING EPISODES OF MILD DIARRHEA IN EARLY INFANCY. (Eng.) MacLean, W. C., Jr.; Klein, G. L.; Lopez de Romana, G.; Massa, E.; Graham, G. G. (Sch. Hygiene and Public Health, Johns Hopkins Univ., Baltimore, MD). *J. Pediatr.* 92(4):562-565; 1978.

9240 EOSINOPHILIC GASTROENTERITIS WITH ASCITES AND COLON INVOLVEMENT. (Eng.) Levinson, J. D.; Ramanathan, V. R.; Nozick, J. H. (New Jersey Coll. Medicine, Newark, NJ). *Am. J. Gastroenterol.* 68(6):603-607; 1977.

9241 ACRODERMATITIS ENTEROPATHICA--A ZINC DEFICIENCY STATE. (Eng.) Rubin, I. L.; Hansen, J. D. L.; Goldberg, B.; Presbury, D. G. C.; Kilroe-Smith, T. A. (Dept. Pediatrics, Univ. Witwatersrand, Johannesburg, South Africa). *S. Afr. Med. J.* 53(13):497-498; 1978.

9242 ENDOSCOPIC PHOTOCOAGULATION BY LASER IRRADIATION IN THE GASTROINTESTINAL TRACT OF MAN. (Eng.) Fruhmorgen, P.; Bodem, F.; Reidenbach, H. D.; Kaduk, B.; Demling, L. (Medizinischen Univ.-Klinik mit Poliklinik, Krankenhausstrasse 12, D-8520 Erlangen, W. Germany). *Acta Hepatogastroenterol.* 25(1):1-5; 1978.

See also, 8632, 8778, 8799, 8806, 8812, 8818, 8820
8876, 8879, 8893, 8933, 8949, 8992, 9001
9009, 9027, 9045, 9057, 9108, 9263.

GENERAL

Parasitology

9243 AMEBIASIS: EPIDEMIOLOGIC STUDIES IN THE UNITED STATES, 1971-1974. (Eng.) Krogstad, D. J.; Spencer, H. C., Jr.; Healy, G. R.; Gleason, N. N.; Sexton, D. J.; Herron, C. A. (Center for Disease Control, Atlanta, GA). *Ann. Intern. Med.* 88(1):89-97; 1978.

Seven investigations of suspected foci of amebiasis in the United States that were performed by the Center for Disease Control between October 1971 and June 1974 indicated that the disease was being vastly overdiagnosed by a number of laboratories. The problem encountered most frequently in these investigations was that WBC in the stool were identified as *Entamoeba histolytica*. Two laboratories found to be in error were in community hospitals, and one was at a teaching hospital associated with a medical school and a school of public health. Altogether, these three laboratories had been diagnosing about 1,200 cases of amebiasis a year for 20 yr. When amebiasis does occur, it is likely to be misdiagnosed. In one outbreak involving four cases and three deaths, amebiasis was not diagnosed until two patients had died and another was critically ill. Sporadic cases may be mistakenly diagnosed as ulcerative colitis and inappropriately treated with steroids. Stool examination for intestinal protozoa is difficult and requires a highly trained laboratory technologist. Because of this, serology should play an increasingly important role by detecting positive titers in patients with active intestinal amebiasis who might otherwise be treated for nonspecific ulcerative colitis. Endemic foci of amebiasis continue to exist in the United States as revealed by two of the investigations, which indicated that the disease was associated with poor sanitation and was transmitted by a person-to-person mode.

9244 BILIARY ASCARIASIS PRESENTING IN THE UNITED STATES. (Eng.) Schulman, A. (Groote Schuur Hosp., Cape Town, South Africa). *J. Gastroenterol.* 68(2):167-170; 1977.

The case of a 44-yr-old Korean woman who presente in the United States with biliary ascariasis is reported. Several weeks after leaving Korea she presented with upper abdominal pain, light-colore diarrhea, nausea, vomiting, weight loss, and feve I.v. cholangiography and tomography revealed a co mon duct dilated to 17 mm and containing a long, vermiform filling defect, as well as a rounded defect just below it. Barium enema and upper gastr intestinal and small bowel examinations showed several similar vermiform defects in the upper jejunum and duodenum. A conventional 2-day regimen of p.o. peperazine was administered. A repeat i. cholangiogram 9 days after this treatment still showed the round defect in the common bile duct, but the vermiform filling defect had disappeared. Exploration and operative cholangiography were carried out during surgery for a gallstone and a stone in the common bile duct. No worms or oth abnormalities were found. *Ascaris lumbricoides* can usually be visualized by i.v. cholangiography because of the absence of obstructive jaundice an can therefore be specifically treated by nonsurgical methods. The radiographic appearance is diagnostic.

9245 LIVER AFFECTION ASSOCIATED WITH *Yersini* enterocolytica INFECTION. (Eng.) Saeb A. (Univ. Bergen Dept. Surgery, N-5016 Haukeland sjukehus, Bergen, Norway). *Acta Chir. Scand.* 14 (7/8):445-450; 1977.

A systematic screening of patients with acute abdominal disease of unknown origin revealed several cases with a positive antibody titer to *Yersinia enterocolytica*, coincident with elevate serum levels of aspartate amino transferase (ASA lactate dehydrogenase (LD), alkaline phosphatase

and bilirubin. Two cases are presented
tail. A woman born in 1916 had had abdom-
pain, fever, and diarrhea since childhood;
e 11 she had an erythema nodosum, and about
she developed epidemic hepatitis of brief dura-
Colics in the right side of the abdomen fol-
by meteorism, vomiting, and diarrhea lasting
ays began in 1949. Plain radiographs showed per-
al irritation and cholecystography was nega-
Right upper quadrant pain, diarrhea, fever,
y stools, a 5-kg weight loss, and swollen
ainful joints led to the admission during
the positive *Y. enterocolitica* antibody
was found. A liver biopsy revealed unchar-
istic liver changes, and splenomegaly was
osed scintigraphically. She was treated
sulfamethoxasol (1 g b.i.d.) and then ampi-
n (0.5 g t.i.d.). The antibody titer (to
terocolytica serogroup 3) remained positive
as stationary (1/160-1/320), and no pathogens
isolated from the stools. She was readmitted
77 for dark urine, clay-colored stools, and
-sided abdominal tenderness; i.v. chole-
graphy revealed no abnormalities. A woman
in 1900 had rheumatic fever in 1948 and
een twice in 1974 (for uncharacteristic dys-
a and for acute swelling of the left knee
). In 1976, she was admitted for dark urine
lay-colored stools; exploratory laparotomy
no gallbladder disease but an inflamed
. Biopsy revealed severe cholestasis, mod-
fatty degeneration, inflammation, and single-
necrosis. Prednisone therapy was insti-
for 2 weeks, withdrawn, and reinstituted
wing relapse. Tetracycline was given be-
seroreactions to *Y. enterocolytica* gave
s of 1/10 and then 1/320 over a 1-week per-
this titer continued to vary, improvement
ery slow, and electrophoresis showed a
ic, active process. No pathogens were isolated
fecal samples. It is suggested that chronic
cute forms of liver disease caused by *Y.
ocolytica* exist and may resemble chole-
tis in presentation.

THE RESULTS OF SURGERY IN AMEBIC LIVER
ABSCESS: EXPERIENCES IN EIGHTY-THREE
NTS. (Eng.) Eggleston, E. C.; Verghese, M.; Handa, A. K.; Gill, S. S. (Christian Medical Coll., Ludhiana, Punjab 141001, India). *Surgery* 83(5): 536-539; 1978.

9247 PREVALENCE OF INTESTINAL PARASITES: (A RURAL STUDY). (Eng.) Yunus, M.; Zaheer, M.; Sinha, S. N. (Jawaharlal Nehru Medical Coll., Aligarh Muslim Univ., Aligarh, India). *J. Indian Med. Assoc.* 69(11):241-245; 1977.

9248 AMOEBIC LIVER ABSCESS. (Eng.) Habibullah, C. M.; Rao, S. R.; Rao, G. N.; Azam, M.; Ramachandran, A. (Osmania Medical Coll., Hyderabad, India). *J. Indian Med. Assoc.* 69(11):247-250; 1977.

9249 SCHISTOSOMIASIS IN IRRIGATION SCHEMES IN THE AWASH VALLEY, ETHIOPIA. (Eng.) Kloos, H.; Lemma, A. (George Williams Hooper Foundation, Univ. California, San Francisco, CA 94122). *Am. J. Trop. Med. Hyg.* 26(5, Part 1):899-908; 1977.

9250 EPIDEMIOLOGY AND MASS-TREATMENT OF ASCARIASIS IN SIX RURAL COMMUNITIES IN CENTRAL IRAN. (Eng.) Arfaa, F.; Ghadirian, E. (Sch. Public Health and Inst. Public Health Res., Univ. Tehran, P.O. Box 1310, Tehran, Iran). *Am. J. Trop. Med. Hyg.* 26(5, Part 1):866-871; 1977.

9251 TREATMENT OF SYMPTOMATIC INTESTINAL AMOEBIASIS WITH TINIDAZOLE. (Eng.) Garcia, E. G. (Inst. Public Health, Univ. Philippines System, Manila, Philippines). *Drugs* 15(Suppl. 1):16-18; 1978.

See also, 8738, 8739, 8781, 8808, 9104, 9115, 9214, 9223, 9236.

GENERAL

Regional Enteritis

METRONIDAZOLE IN CROHN'S DISEASE: A
DOUBLE BLIND CROSS-OVER CLINICAL TRIAL.
) Blichfeldt, P.; Blomhoff, J. P.; Myhre, E.;
, E. (Rikshospitalet, Oslo 1, Norway). *Scand.
stroenterol.* 13(1):123-127; 1978.

ble-blind crossover study of the value of
nidazole was carried out in 22 patients with
e Crohn's disease who were also being treated
salazosulfapyridin or prednisone. The patients received metronidazole (1,000 mg/day, p.o.) or placebo for 2 months. No statistically significant effect was observed in the overall clinical condition of the 20 patients who completed the trial, although the hemoglobin level rose and ESR fell significantly ($p<0.01$ and $p<0.05$, resp.) during metronidazole treatment. In the six patients in whom Crohn's disease involved only the colon, there was a striking improvement in symptoms, which included diarrhea and abdominal pain. Hemoglobin

rose and ESR fell in these patients during treatment. These results indicate that metronidazole is useful only in the treatment of Crohn's colitis.

9253 THE LONG-TERM PROPHYLACTIC EFFECT OF SALAZOSULPHAPYRIDINE (SALAZOPYRIN®) IN PRIMARILY RESECTED PATIENTS WITH CROHN'S DISEASE: A CONTROLLED DOUBLE-BLIND TRIAL.

(Eng.) Wenckert, A.; Kristensen, M.; Eklund, A. E.; Barany, F.; Jarnum, S.; Worning, H.; *et al.* (Herlev Univ. Hosp., DK 2730 Herlev, Denmark). *Scand. J. Gastroenterol.* 13(2):161-167; 1978.

A double-blind study of the possible prophylactic effect of salazosulphapyridine (SASP) in the treatment of Crohn's disease was carried out in 66 patients. Treatment with SASP (3 g/day, 32 patients) or placebo was started within 1 month following the patients' first surgical resection of diseased small or large bowel. The treatment period was 1 yr, and this was later prolonged to 18 months. Relapse-free patients were observed for 24 months. Using actuarial analysis, the four relapses that occurred in the patients treated with SASP and the nine in the placebo group after 18 months of treatment were calculated to correspond to cumulative relapse rates of 0.13 and 0.45, resp. ($0.10<p<0.15$). The results support the proposal that SASP is useful in preventing the recurrence of Crohn's disease following surgery. The need for large-scale trials is emphasized.

9254 URINARY OXALATE EXCRETION RELATED TO ILEOCOLIC SURGERY IN PATIENTS WITH CROHN'S DISEASE.

(Eng.) Andersson, H.; Filipsson, S.; Hulten, L. (Sahlgrenska sjukhuset, S-413 45 Goteborg, Sweden). *Scand. J. Gastroenterol.* 13(4): 465-469; 1978.

The effect of high oxalate and high fat diets on urinary oxalate excretion in 63 patients with Crohn's disease was studied before and after surgery and compared with results in 26 healthy controls. The urinary oxalate excretion was studied in relation to the length of the resected ileal segment in patients who had restorative and colectomy procedures and also in relation to the fecal excretion of fat and bile salts and to urinary excretion of vitamin B_{12} and calcium. Subjects received a standard hospital diet (about 75 g fat), with or without a high oxalate (800-900 mg) supplement from spinach and/or a high fat (150 g fat) supplement. Urinary oxalate excretion increased significantly when a high-oxalate diet was consumed by 15 patients with ileal or ileocolic disease ($p<0.001$) and in 23 patients with ileocolic resection or colectomy ($p<0.005$) compared with oxalate excretion on the standard diet. Controls on standard and high-oxalate diets had nearly identical oxalate excretion levels. Urinary oxalate excretion was significantly higher than control values in patients with ileocolic resections on both diets ($p<0.02$ and $p<0.001$, resp.) and in colectomized patients on the high-oxalate diet ($p<0.001$). A high-fat/high-oxalate diet increased urinary oxalate excretion in 25 patients with ileal resection ($p<0.01$) but not in 11 colectomized patients. In 35 patients subjected to ileal resection in conjunction with a limited colon resection (but not in the colectomized patients), the urinary oxalate excretion increased with the length of the resected ileal segment ($r=0.40$, $p<0.02$). A linear correlation ($r=0.50$, $p<0.005$) was obtained between the excretion of fat and of urinary oxalate in 33 patients with ileocolic resection (but none was observed in the colectomized patients). In 34 patients subjected to ileocolic resection, there was an exponential correlation between urinary oxalate and vitamin B_{12} excretion ($r=0.51$, $p<0.005$). No correlation between urinary oxalate excretion and bile salt malabsorption was found. In all patients, calcium excretion was low (5 mmol/24 hr for most patients), but no correlation with urinary oxalate excretion was found. A low-fat, low-oxalate, and high-calcium diet is recommended to prevent hyperoxaluria in patients after ileocolic resection, particularly where a substantial part of the colon is preserved.

9255 INVESTIGATION OF THE PATHOGENESIS AND ETIOLOGY OF CROHN'S DISEASE.

(Ger.) Raguse, T.; Bracker, H. P. (Abtlg. Chirurgie, Med. Fakultat d. RWTH, Goethestrasse 27/29, 51 Aachen, W. Germany). *Aktuel. Chir.* 12(5):317-326; 1977.

A study was undertaken to clarify the role of humoral and cellular competence of the immune syste in the etiology and pathogenesis of Crohn's disease (CD). Nine women and 11 men with severe, chronic recurring CD were studied. The levels of complemen factors C3 and C4 in the patients did not differ significantly from those of controls. IgG and IgA determinations were also within normal limits. IgM levels (222.1 ± 96.55 mg%), however, were significantly ($p<0.05$) above normal (102 ± 30 mg%). The sera of CD patients had a significant ($p<0.05$) inhibitory effect on stimulation in the mixed lymph cyte reaction (MLR). CD patients also had markedly increased lymphocyte counts. A marked increase in the absolute numbers of B cells existed, while the T cell count was decreased. Phytohemagglutinin stimulation showed a significant ($p<0.05$) anergy of the lymphocytes; in six patients, there was an extreme decrease in sensitivity to stimulation of the T lymphocytes. These findings indicate a distribution of the cellular immune system (in the sense of lymphocytic anergy) of undetermined cause. The inhibitory effect of CD sera in the MLR indicates blocking of the lymphocyte-specific cell function, which has been recognized in viral infections. Treatment of CD with immunosuppressive drugs is therefore questionable, while stimulation of the cellular immune system, as with Thymosin or Levamisole, is beneficial. Dietary supplements of amino acids are essential.

9256 PSEUDOPOLYPOID FORMS OF CROHN'S DISEASE.

(Fre.) Rouger, P.; Tubiana, J. M.; Douvin, D.; Chermet, J.; Monnier, J. P.; Malafosse, M *et al.* (Hopital Saint-Antoine, 184, rue du Faubour

int-Antoine, F 75571 Paris Cedex 12, France).
Radiol. Electrol. Med. Nucl. 58(12):807-810;
77.

ree cases are reported in men (ages 49, 34, and
yr, resp.) and one in a woman (age 26 yr) of
ohn's disease (regional ileitis) of a pseudo-
lypoid type. The inflammatory polyps were lo-
ted in the colon and the ileum and could be lo-
lized or diffuse. Actually, the polyps were the
sult of deep ulcerations of the intestinal mu-
sa surrounding healthy or only edematous mucosa
at appeared to project into the lumen of the in-
stinal tract. Diagnostically, pseudopolypoid
ohn's disease must be distinguished from ulcero-
morrhagic rectocolitis, familial intestinal poly-
sis, and lymphoid polyposis. X-ray studies alone
nnot be relied upon for accurate diagnosis, which
established by histological examination of bi-
sy material.

57 ISOLATED CROHN'S DISEASE OF VERMIFORM
APPENDIX. (Eng.) Tseng, C. H.; Zinner,
; Lahiri, N.; Das, K. (Veterans Admin. Center,
yton, OH). *Abdom. Surg.* 20(1):17-19; 1978.

58 SUBDIAPHRAGMATIC AIR AS A SIGN OF PER-
FORATED REGIONAL ENTERITIS: CASE REPORT.
ng.) Welch, J. P. (Womack Army Hosp., Fort Bragg,
28307). *Milit. Med.* 142(11):880-881; 1977.

59 RELATIONSHIP OF ERYTHEMA NODOSUM TO OTHER
MANIFESTATIONS OF CROHN'S DISEASE. (Eng.)
cobs, M.; Winkelman, E. I.; Farmer, R. G. (Cleve-
nd Clinic Foundation, Cleveland, OH). *Cleve.
in. Q.* 44(4):145-148; 1977.

9260 GIANT PSEUDOPOLYPOSIS CAUSING COLONIC OBSTRUCTION: REPORT OF A CASE SEEMINGLY ASSOCIATED WITH CROHN'S DISEASE OF THE COLON. (Eng.) Gruner, O. P. N.; Refsum, S.; Fausa, O.; Hognestad, J. (Rikshospitalet, Oslo 1, Norway). *Scand. J. Gastroenterol.* 13(1):65-69; 1978.

9261 LOCALIZED GIANT PSEUDOPOLYPOSIS IN CROHN'S DISEASE: COLONOSCOPIC FINDINGS. (Eng.) Shah, S. M.; Rogers, H. L.; Nagai, N. (Veterans Admin. Hosp., 300 E. Roosevelt Rd., Little Rock, AR 72206). *Dis. Colon Rectum* 21(2): 104-106; 1978.

9262 RADIOLOGY OF CROHN'S DISEASE. (Eng.) Bodart, P.; Pringot, J. (Cliniques Universitaires Saint-Luc, Universite Catholiques de Louvain, Avenue Hippocrate 10, 1200 Bruxelles, Belgium). *J. Belg. Radiol.* 60(1):83-101; 1977.

9263 ANOREXIA NERVOSA AND CROHN'S DISEASE. (Eng.) Metcalfe-Gibson, C. (Manchester Royal Infirmary, S5 Unit, Oxford Rd., Manchester, England). *Br. J. Surg.* 65(4):231-233; 1978.

See also, 8625, 8973, 9006, 9026, 9027, 9028, 9036, 9231.

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

ABASOV, I.T.
8923
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8979, 9006
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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolis Digestive Diseases. This specialized information medium has been initiated to fill an existing great need the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal t Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers releva to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

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August 1979

Dear Users:

It is with regret that the National Institute of Arthritis, Metabolism, and Digestive Diseases is discontinuing the publication of GASTROENTEROLOGY ABSTRACTS AND CITATIONS with Volume 12, Index Issue. With limited financial resources available to support research in the field of gastroenterology, it is necessary to make the maximum use of these limited funds.

When the publication GASTROENTEROLOGY ASBSTRACTS AND CITATIONS was initiated in 1967, it was both difficult and time consuming to locate relevant literature in the field. With this lack of resources, in order to move the field along, and as part of the support of research, the National Institute of Arthritis, Metabolism, and Digestive Diseases undertook publication of GASTROENTEROLOGY ABSTRACTS AND CITATIONS. Today there are more and different resources available for finding citations and abstracts of the literature in the field than there were a number of years ago, and there is no longer the void that prompted the development of GASTROENTEROLOGY ABSTRACTS AND CITATIONS.

In view of the limited resources of the Institute for research programs and the availability today of other literature sources, the Institute has decided to apply its resources maximally to the support of research activities. The last issue will be Volume 12, Index Issue.

Now that abstracts are available through MEDLINE (the National Library of Medicine's online computer retrieval of literature references) there is less need to publish an abstract journal. We shall be working with the National Library of Medicine, whose capability has greatly increased, in making the National Library of Medicine's vocabulary listing, Medical Subject Headings, more effective in the field of gastroenterology. We would welcome any comments and suggestions you may have in searching MEDLINE.

Yours truly,

Harold Roth

Harold P. Roth, M.D.
Associate Director for Digestive Diseases
and Nutrition
National Institute of Arthritis, Metabolism,
and Digestive Diseases

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